

Sarah J. Crooks, OSB No. 971512  
SCrooks@perkinscoie.com  
PERKINS COIE LLP  
1120 N.W. Couch Street, Tenth Floor  
Portland, OR 97209-4128  
Telephone: 503.727.2000  
Facsimile: 503.727.2222

Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT  
DISTRICT OF OREGON  
EUGENE DIVISION

Steve and Kim Spina, on behalf of  
themselves and all others similarly situated,

Plaintiffs,

v.

Uponor, Inc., successor to Uponor North  
America, Inc., and Radiant Technology,  
Inc.,

Defendants.

No. \_\_\_\_\_

CLASS ACTION ALLEGATION  
COMPLAINT

(Unlawful Trade Practices; Negligence;  
Negligent Failure to Warn; Negligent  
Misrepresentation; Breach of Express  
Warranties; Declaratory and Injunctive  
Relief)

DEMAND FOR JURY TRIAL

Plaintiffs Steve and Kim Spina, on behalf of themselves and all others similarly situated,  
bring this Complaint in class action and state and allege as follows:

1- COMPLAINT

73865-0001/LEGAL20077008.4

**Perkins Coie LLP**  
1120 N.W. Couch Street, Tenth Floor  
Portland, OR 97209-4128  
Phone: 503.727.2000  
Fax: 503.727.2222

## **PARTIES**

1. Plaintiffs and putative class representatives Steve and Kim Spina are husband and wife and are the owners of property in Bend, Oregon.

2. Plaintiffs bring this case on behalf of themselves and a class of similarly situated persons and entities.

3. Defendant Uponor, Inc. is in the business of, among other things, manufacturing, advertising, warranting, and selling plumbing components.

4. Uponor, Inc. is the successor to Uponor North America, Inc. and is an Illinois corporation that maintains its principal place of business in Minnesota.

5. Defendant Radiant Technology, Inc. ("RTI") is a foreign entity that is or was in the business of, among other things, manufacturing, advertising, warranting, and selling plumbing components.

6. RTI is or was a wholly owned subsidiary of Uponor. On information and belief, RTI currently maintains its principal place of business in Minnesota.

7. Uponor and RTI are jointly and/or severally liable to Plaintiffs and the putative class members as joint venturers, or in the alternative, operate such that any pretend corporate formalities amongst and between the two should be disregarded or pierced, or in the alternative, are subject to an agency relationship, or in the alternative, are subject to predecessor and successor liability theories, or in the alternative, are otherwise jointly and severally liable for all acts and omissions alleged herein.

## **JURISDICTION AND VENUE**

8. This Court has jurisdiction over the parties, the putative class, and the causes of action asserted herein pursuant to 28 U.S.C. § 1332(d)(2) because Plaintiffs and Defendants are citizens of different states and the amount in controversy exceeds \$5 million.

9. Venue in this forum is proper pursuant to 28 U.S.C. § 1391 because some or all of the putative class members reside in Oregon, the causes of action for the class representatives

## **2- COMPLAINT**

arose, in part, in Oregon, the causes of action for the putative class members arose, in part, in Oregon, and Uponor and RTI transact business within Oregon.

### **SUMMARY OF CLASS ACTION ALLEGATIONS**

10. Plaintiffs on behalf of themselves and all other persons and entities similarly situated bring this action for and on behalf of the owners of homes and buildings with Uponor and/or RTI plumbing systems with cross-linked polyethylene ("pex") tubing as well as any person or entity who has paid for the repairs of or damage caused by such systems. These pex plumbing systems are defective.

11. Uponor and RTI have sold brass insert fittings for pex plumbing systems throughout the United States.

12. Uponor and RTI warranted and advertised that their pex plumbing systems with brass insert fittings had a 25-year warranty that expressly covered consequential damages arising from leaks or failures in the plumbing systems.

13. Uponor and RTI have warranted and advertised their brass fittings as being, among other things, "proven," "carefully engineered," "reliable" and resistant to corrosion.

14. These representations, however, were untrue, and Uponor and RTI's brass insert fittings have began failing prematurely. These failures resulted in substantial damage to property other than the plumbing system itself.

15. After selling these brass insert fittings across the country, Uponor now admits that the fittings are "defective," "unreasonably dangerous," and not merchantable. Uponor and RTI, however, refuse to replace the plumbing systems of all persons and entities who own properties containing the admittedly defective fittings.

16. The failures of the Uponor and RTI brass insert fittings have and will in the future cause water leaks. These leaks have and will in turn cause extensive damage to other property including the homes and personal property of the owners.

17. Plaintiffs and the putative class members have been damaged as a result of the design, development, advertisement, marketing, and sale misconduct of Uponor and RTI in connection with Uponor and RTI pex plumbing systems that utilize brass insert fittings.

18. Plaintiffs and the putative class members seek damages arising from and proximately caused by Uponor and RTI's breach of consumer protection statutes, fraud and misrepresentations, negligence, breach of contract, and breach of warranties. Plaintiffs and the putative class members also seek declaratory and injunctive relief, as described below.

## **BACKGROUND**

### **Defendants' Defective Plumbing Products**

19. Uponor and RTI sell various plumbing products including pex plumbing systems and their components.

20. Pex is an acronym for cross-linked polyethylene. Polyethylene is the raw material and the "X" in the generic name "Pex" refers to the cross-linking of the polyethylene across its molecular chains.

21. For many years, plumbers and homeowners used copper piping for potable water plumbing systems.

22. For the last several decades, Uponor, RTI, and other companies in the United States began selling and plumbers began installing potable water plumbing systems with pex tubing.

23. Uponor and RTI marketed and sold plumbing systems using pex tubing for use in residential and commercial settings.

24. Uponor and RTI marketed their pex plumbing systems as being easier to install, cheaper, and longer-lasting than the traditional copper plumbing systems.

25. In approximately 1997, Uponor and/or its parent company purchased RTI. In doing so, Uponor purchased RTI's assets and liabilities, its entire produce line, and the rights to RTI's intellectual property.

26. Although RTI was previously involved only in the sale of radiant heating systems, after RTI was acquired by Uponor, it began selling a pex plumbing system utilizing brass insert fittings that purportedly conformed to industry standards, including ASTM Standard F1807, which is an international standard for metal insert fittings for use with pex tubing.

27. F1807 insert fitting systems typically use a crimp ring or stainless steel claim connection design in which insert fittings made of brass alloy are inserted into the pex tubing. The brass fittings are secured by a special tool that crimps copper rings or stainless steel clamps around the outside of the tubing, which in turn creates a seal between the pex tubing and the brass fittings.

28. The crimp and stainless steel clamp system design used by Uponor and RTI for their pex plumbing systems places a great deal of stress on the brass insert fittings when the system is assembled as intended.

29. The design, choice of material, and manufacturing methods of the F1807 brass insert fittings also result in residual stress within the fittings following the manufacturing process but before the system is assembled in the field.

30. For some period of time, RTI sold the plumbing components and systems using the F1807 fittings under its own name or label. However, Uponor, RTI's parent company, also promoted, marketed, and sold RTI systems to, for example, the manufactured structures market. These fittings and systems were sold at least in part under the trade name "Plumb-Pex."

31. On October 27, 2004, Uponor issued a press release that stated that it would close the RTI operations in early 2005. In that press release, Uponor promised that it "will honor existing RTI and Plasco warranties."

32. By December 2004, Uponor began receiving RTI's inventory, including F1807 fittings, and began handling the ongoing purchase and distribution of RTI's Plumb-Pex system.

33. Upon information and belief, Uponor closed the RTI operations in early 2005 and thereafter continued to sell the Plumb-Pex system and the F1807 fittings.

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34. Defendants' F1807 fittings are easily identified by a "P-Pex" stamp placed on the brass insert fittings and stainless steel clamps.

35. Defendants knew or should have known that the brass alloy used for the brass insert fittings they sold and marketed made the fittings susceptible to premature failure through various processes like dezincification and stress corrosion cracking.

36. Defendants knew or should have known that the fitting design, pex system design, and choice of brass alloy also made the brass insert fittings susceptible to premature failure through stress corrosion cracking and/or dezincification.

37. Defendants knew or should have known that the manufacturing process used for the brass insert fittings left residual stress and machining imperfections that would cause premature failure through stress corrosion cracking.

38. The design, materials choices, and manufacturing practices of the brass fittings marketed and sold by Defendants have created a product that is damaged and begins to fail on its first day of use, even if perfectly installed in its intended environment.

39. Because of their defective design and manufacture, Defendants' F1807 fittings failed in their intended purpose.

40. Because of their defective design and manufacture, Defendants' F1807 fittings are inherently defective and are substantially certain to fail within the express warranty provided with the fittings and/or the useful life of the fittings.

41. Plaintiffs and members of the putative class own, have installed, or have paid damages caused by Uponor and/or RTI plumbing systems with F1807 fittings that have already failed prematurely or are in the process of failing prematurely, and thus have suffered or are reasonably certain to suffer actual injury.

### **Uponor Admits its Plumbing Products are Defective**

42. Although they never told consumers, plumbers, or plumbing distributors that they were not the designers and manufacturers of the F1807 fittings, Defendants now claim that neither Uponor nor RTI actually designed or manufactured the fittings that they sold.

43. No later than 2006, Uponor and/or RTI began receiving reports that their F1807 fittings were failing prematurely when used as intended.

44. For example, Defendants received reports from NVR, Inc., a large national homebuilder, that F1807 fittings were failing in homes it had constructed.

45. As a result of the premature failures of the F1807 fittings, Defendants stopped selling F1807 fittings. Uponor now only sells insert fittings manufactured to comply with ASTM Standard F1960 or other ASTM standards.

46. Knowing that the F1807 fittings were defective, Uponor allowed its distributors and contractors to return unused Plumb-Pex components for a refund in late 2006.

47. At some point in 2006, Uponor sought reimbursement from Unique Industrial Product Company for the money Uponor paid as a result of premature failings of the F1807 fittings.

48. In seeking reimbursement from Unique Industrial, Uponor claimed that the F1807 fittings it and RTI had obtained from Unique Industrial, and which Uponor and RTI had sold to the public, were defectively designed or manufactured.

49. Ultimately, Uponor sued Unique Industrial in federal court in Texas. In Uponor's complaint, Uponor admitted that F1807 fittings were "defectively manufactured" and "were not merchantable, or suited for their reasonable, expected and intended use in residential plumbing systems, and which were not free from defects in materials, design and workmanship." Uponor also admitted in its complaint that the F1807 fittings were "defective and unreasonably dangerous." A copy of Uponor's Amended Complaint is attached as Exhibit A.



50. In the course of its lawsuit against Unique Industrial for the premature failures of the F1807 fittings, Uponor retained the services of Cynthia L. Smith, an engineer and one of Uponor's former employees.

51. Smith issued reports and opinions in which she concluded that the F1807 fittings bought from Unique Industrial and sold by Defendants were defectively designed and manufactured. She concluded that the fittings were failing because of stress corrosion cracking that was the result of improper manufacturing practices and off-specification materials. Copies of Smith's report and affidavit are attached hereto as Exhibits B and C, respectively.

52. Smith also issued reports and opinions in which she concluded that the F1807 fittings bought from Unique Industrial and sold by Defendants had not failed because of installation practices or water conditions. She drew her conclusions from analyzing fittings that had never been installed and yet were defective, and from a history of failings that occurred in multiple states across varying water chemistry conditions and contractors with previous experience successfully installing the components.

53. Smith also issued reports and opinions in which she concluded that the F1807 fittings bought from Unique Industrial and sold by Defendants had failed not because of water conditions. She stated: "My conclusion that faulty installation was not a cause of failure in the brass fittings supplied by Unique was further supported by the history of fitting failures. A sudden rash of failures occurred in multiple states (where varying water chemistry conditions existed) during a narrowly defined time period, involving various plumbing contractors who had previous experience successfully installing these components. This fact also undermines any question of installation error." See Exhibit C, ¶ 13.

54. In the course of its lawsuit against Unique Industrial, Uponor also submitted a report and opinion from engineer Thomas Eager. Like Smith, Eager also concluded that the fittings sold by RTI and Uponor were defectively manufactured. A copy of Eager's report is attached as Exhibit D.



55. Eager concluded that the fittings had failed because of improper machining practices, improper alloy composition, and microstructure. Eager also concluded that the composition of many of the F1807 fittings failed to comply with ASTM standards, and that inappropriately elevated finish hardness and other residual stress from manufacture had contributed to the premature failure of the F1807 fittings.

56. In addition to these judicial admissions, Uponor now publicly criticizes the F1807 fittings design. In a document currently available on its website, Uponor states that compared to its current F1960 fittings, the F1807 fittings Defendants previously sold contained "[t]hinner wall offer[ing] less resistance to stress and corrosion." A copy of that advertisement is attached as Exhibit E.

#### **Uponor Replaces Some of the Defective Fittings and Plumbing Systems**

57. Recognizing that the F1807 fittings they sold were defective, Defendants have paid for or authorized the replumbing of certain properties containing those systems.

58. For example, Defendants have paid for or authorized the replumbing of properties containing systems with F1807 fittings in Virginia.

59. In addition, Defendants have paid for or authorized the replumbing of properties containing systems with F1807 fittings in Nevada. In that replumbing program, Defendants agreed to replumb all homes built by D.R. Horton in which Defendants' F1807 fittings are installed.

60. In an October 2008 letter to homeowners, RTI advised homeowners "of the risk that the plumbing system in your home may be susceptible to future leaks." In that same letter, RTI offered to pay for complete repiping of plumbing systems owned by the purchasers of D.R. Horton homes. A copy of the RTI letter is attached as Exhibit F.

### **Defendants Did Not Adequately Test the F1807 Brass Insert Fittings**

61. Contrary to statements made in their advertising and marketing, Defendants did not test and did not ensure that the F1807 fittings had been tested in their anticipated environments before selling those fittings to the public.

62. Defendants did not "end use" test the F1807 fittings in pex plumbing systems and instead they or their suppliers used various assumptions when choosing or specifying the design and materials for this system. Such a practice violates engineering and manufacturing standards and accepted practice. Defendants also failed to require their suppliers to perform such testing.

63. Defendants and/or their suppliers also conducted inadequate testing on their F1807 fittings and failed to things that they knew or should have known would lead to premature failure of the brass fittings. Defendants also failed to require their suppliers to perform such testing.

64. Defendants and/or their suppliers also failed to investigate or test whether well-known and expected water conditions would lead to premature failure of the F1807 fittings. Defendants also failed to require their suppliers to perform such testing.

### **Defendants Falsely Advertised their Pex Plumbing Systems**

65. Defendants falsely advertised that their pex plumbing systems – including their F1807 fittings components – were reliable despite never testing and determining the reliability of the product when used in the real world.

66. Defendants also falsely advertised that RTI had a long history in the plumbing industry and falsely claimed that the Plumb-Pex system was proven, reliable, and the result of rigorous engineering and quality control.

67. For example, on RTI's website, [www.radiant-tech.com](http://www.radiant-tech.com), Defendants advertised in 1997 that Radiant Technology was only in the business of selling radiant heating systems. Yet less than a year later, RTI claimed on the same website that "Radiant Technology is a North American leader in the manufacture of plumbing and heating products." Defendants knew that

this statement was false and misleading because, among other reasons, RTI had just started selling plumbing systems for potable water. In addition, Defendants knew that they were not in fact manufacturing plumbing systems and knew that they were not the manufacturer of the Plumb-Pex brass fittings. Defendants continued to make these false statements on the www.radiant-tech.com website until the fall of 2002. Defendants then continued to make the same or similar false statements on RTI's new website, www.rti-systems.com, until the fall of 2004 when they announced that RTI would be closed.

68. On RTI's website, www.radiant-tech.com, Defendants also falsely claimed in 1998:

- (a) "Plumb-Pex is proven, reliable and completely safe for you and your family."
- (b) "Our Plumb-Pex system is a carefully engineered flexible piping system that provides a durable, proven, and guaranteed solution to all your plumbing needs."
- (c) "RTI maintains the highest quality standards in the industry."
- (d) "With Radiant Technology's dedication to quality, you're assured of a long lasting and trouble free plumbing system."

Defendants knew these statements were false and misleading because, among other reasons, RTI apparently did not do any engineering or quality control of the Plumb-Pex system and instead simply bought the fittings from manufacturers located in Asia. The system had little or no track record in the field, and Defendants had no idea whether it was "reliable," "completely safe," "durable," or "proven." They also had no basis for representing that the system would be "long lasting and trouble free" or that RTI "maintains the highest quality standards," as they advertised to the public. Defendants have since admitted in their lawsuit against Unique Industrial that Unique Industrial did not use acceptable quality standards. Defendants continued to make these false statements on the www.radiant-tech.com website until at least the fall of 2002. They then continued to make the same or similar false statements on RTI's new website, www.rti-systems.com, until the fall of 2004 when they announced that RTI would be closed.

69. In 2002, Defendants published a Plumb-Pex brochure they distributed to consumers and made available on the RTI website, [www.rtisystems.com](http://www.rtisystems.com). In that brochure, Defendants falsely claimed:

- (a) "[The Plumb-Pex System] is a carefully engineered flexible piping system which provides a durable, proven, and guaranteed solution to all your plumbing needs."
- (b) "Plumb-Pex is proven, reliable and completely safe for you and your family."
- (c) "We have the highest quality standards in the industry."
- (d) "With RTI's dedication to quality, you're assured of a long lasting and trouble free plumbing system."

Defendants continued to distribute the same or similar statements in the brochure for at least several years. Defendants knew that these statements were false and misleading because, among other reasons, RTI apparently did not do any engineering or quality control of the Plumb-Pex system and instead simply bought the fittings from manufacturers located in Asia. The system had little or no track record in the field, and Defendants had no idea whether it was "carefully engineered," "completely safe," "durable," or "proven." They also had no basis for representing that the system would be "long lasting and trouble free" or that RTI had "the highest quality standards." Defendants have since admitted in their lawsuit against Unique Industrial that Unique Industrial did not use acceptable quality standards. A copy of that Complaint is attached as Exhibit A.

70. Beginning no later than 2003, the "Who We Are" section of the RTI website, [www.rtisystems.com](http://www.rtisystems.com), falsely claimed:

- (a) "Our Radiant Technology Heating and Plumb-Pex Plumbing Systems are a result of over 20 years of experience."
- (b) "All RTI products undergo thorough testing to pass not only our own strict quality standards, but to assure that we exceed those set by independent quality assurance agencies both in America and abroad."

Defendants continued to make these statements on the website for at least several years. Defendants knew that these statements were false and misleading because, among other reasons,

the Plumb-Pex system was new and had not been in existence for 20 years. Nor did RTI have 20 years of experience in the plumbing industry. Defendants also knew that these statements were false and misleading because RTI did not do any quality control of the Plumb-Pex system and instead simply bought the fittings from manufacturers located in Asia. Defendants therefore had no basis to represent that the system had undergone thorough testing to pass RTI's "strict quality standards." Defendants knew that they did nothing to test the quality of the system and had no idea whether any testing or quality assurance was being done by the suppliers. Defendants have since admitted in their lawsuit against Unique Industrial that Unique Industrial did not use acceptable quality standards.

71. On information and belief, some or all of the false statements and misrepresentations described in the preceding paragraphs were repeatedly restated by Defendants' sales personnel and manufacturer's representatives in the course of sales of the F1807 fittings at issue in this case. All of the sales and product literature provided by Defendants falsely implied that the Plumb-Pex system was proven, reliable, time tested, and the result of rigorous engineering and quality control practices. Defendants knew at the time these statements were provided to consumers, suppliers, and contractors that the statements were false and unsupported.

72. On information and belief, Defendants and their representatives knowingly misrepresented RTI's experience in the plumbing industry in communications with consumers, suppliers, and contractors. Contrary to the statements referenced herein, RTI was new to the potable water plumbing industry and had no experience in the design, manufacture, and quality control of potable water plumbing systems and the F1807 fittings used for those systems.

73. On information and belief, Defendants and their representatives knowingly misled consumers, suppliers, and contractors into believing that RTI and/or Uponor actually designed, manufactured, and quality-controlled the Plumb-Pex system. Defendants knew that they

performed none of those tasks and had not provided any oversight regarding the materials and manufacturing processes used to make the F1807 fittings used in those systems.

74. The falsity of Defendants' representations set out above is demonstrated by Defendants' judicial admissions, which contradict the statements Defendants made to their consumers. For example, Uponor now states in its lawsuit against Unique Industrial that Unique Industrial:

- (a) "[S]elected Duksan Metal Co. of Korea to design, engineer and manufacture the Fittings. Neither RTI nor Uponor participated in the selection of Duksan nor did they have contact with Duksan relating to the means, methods or circumstances regarding the manufacture of the fittings."
- (b) Defectively manufactured the F1807 fittings.
- (c) Failed to take reasonable steps to ensure that the F1807 fittings would not be subject or prone to fracturing post-manufacture.
- (d) Failed to properly test, inspect, and evaluate the F1807 fittings prior to distributing them.
- (e) Supplied RTI and Uponor with fittings that were not merchantable or suited for their reasonable, expected, and intended use.
- (f) Failed to supply fittings that complied with ASTM Standard F1807 and the related chemical composition requirements.

See Exhibit A, ¶¶ 10, 61.

75. Defendants also knowingly misled consumers into believing that the Plumb-Pex system was designed, manufactured, and quality-controlled in the United States. For example, Defendants placed stamps on the F1807 fittings that read, "P-Pex" and "US-PW." Defendants knew and intended that such stamps would mislead consumers into believing that the F1807 fittings were manufactured in the United States for use in potable water ("PW") systems. Defendants knew that they had sourced the design, manufacturing, and quality control to foreign manufacturers without any oversight by Defendants, and instructed the manufacturers in Asia to affix the "US-PW" stamp to conceal the fact that Defendants had purchased the fittings cheaply from foreign manufacturers.



76. Whether the F1807 fittings were manufactured in the United States was a material fact for the consumers and purchasers of the Plumb-Pex systems. Defendants both intentionally and by omission concealed the country of origin of the fittings with the intent that consumers and purchasers would rely on those representations and omissions.

77. Plaintiffs, their predecessors and their representatives believed, based on Defendants' representations, that Defendants designed, manufactured, and quality-controlled the Plumb-Pex fittings. Plaintiffs and their representatives would not have purchased or used Plumb-Pex fittings if they had known the truth about who designed, manufactured, and quality-controlled the fittings.

78. When Defendants and their representatives made each of the misrepresentations described above, Defendants knew that the representations were false and/or misleading. Defendants and their representatives intended that consumers and purchasers of the Plumb-Pex system would rely on the false and misleading statements. On information and believe, the plumbing company that installed the plumbing system at the Spinass' house received and relied on such representations in its decision to purchase and install Defendants' Plumb-Pex plumbing system.

79. Defendants also falsely stated in their online and brochure marketing that the F1807 fittings used in the Plumb-Pex systems complied with ASTM Standard F1807. For example, the April 2003 Plumb-Pex Plumbing Systems Design and Installation brochure states that "Plumb-Pex fittings are manufactured of solid brass to ASTM F-1807 'Metal Insert Fittings' specifications." A copy of that brochure is attached as Exhibit G. Other literature produced by Defendants makes similar representations and similar representations were repeatedly made throughout the years on Defendants' [www.radiant-tech.com](http://www.radiant-tech.com) and [www.rti-systems.com](http://www.rti-systems.com) websites.

80. In addition to the representations made in their advertising materials and on their websites, the brass insert fittings sold by Defendants had a stamp on the side of the fitting indicating that the fitting conformed to ASTM F877 and ASTM F1807. When a product or



packaging is marked with the ASTM designation F1807, the product is represented to have been manufactured, tested, inspected, and sampled in accordance with F1807 and has been found to meet F1807 requirements.

81. On information and belief, Defendants and their representatives knowingly misled consumers into believing that the F1807 fittings in their Plumb-Pex system complied with ASTM standards. Plaintiffs, their predecessors, their representatives and other consumers relied on these misrepresentations because the Plumb-Pex fittings could not have been used in potable water systems in the United States without compliance with those standards. Defendants, therefore, passed off brass fittings as being of a particular quality, standard, or grade that they were not.

82. Defendants fittings did not comply with various aspects of the F1807 requirements, including alloy composition and dimensions. Uponor's own experts Smith and Eager have concluded that the Plumb-Pex fittings failed to meet F1807 requirements. Defendants knew or should have known that their advertising statements about compliance with ASTM standards were false. Defendants also knew or should have known that their certification of compliance with ASTM standards by stamping those designations on the fittings were false.

83. Defendants and their authorized agents and distributors made each of the statements, representations, and warranties described above with the intent of inducing consumers, plumbing suppliers, builders, and plumbers to purchase and install pex plumbing systems and Defendants' F1807 fittings in their properties.

#### **Defendants Omitted Material Information about their Pex Plumbing Systems**

84. Defendants also made numerous material omissions and withheld important information relating to the design, reliability, and performance of the F1807 fittings and pex plumbing systems.

85. Among these omissions were the failure to inform purchasers and consumers about the tendency for the F1807 fittings to fail because of stress corrosion cracking or

dezincification, and to inform them that Defendants and their suppliers had done little or no testing to determine whether these fittings and the systems in which they were used would perform well in real world conditions.

86. Defendants also omitted material information about the limitations of the high zinc content yellow brass fittings, including, for example, that the published literature going back as far as the 1940s had shown the propensity of that type of brass to crack in even pure water.

87. Defendants also omitted material information about the limitations of the high zinc content yellow brass fittings, including, for example, that the propensity of that type of brass to crack increases exponentially following rough machining or finish practices like those used by Defendants and/or their suppliers.

88. Defendants also omitted material information from consumers about their lack of quality control or input about the design and manufacturing practices used to make the Plumb-Pex fittings.

89. Defendants also omitted material information from consumers including the fact that Defendants had completely delegated the design, manufacture, and quality control of the Plumb-Pex fittings to foreign manufacturers located in Asia or elsewhere.

90. Defendants also omitted material information from consumers about the country of origin and the origin of the design and manufacture of the Plumb-Pex fittings.

91. Defendants also omitted material information from consumers about the availability of materials that were more resistant to stress corrosion cracking than the high zinc content yellow brass used to make Plumb-Pex fittings.

92. Defendants also omitted material information from consumers about RTI's lack of experience in the plumbing industry and the fact that it had not manufactured or sold pex plumbing products before it began selling the Plumb-Pex system.

93. On information and belief, each of the omissions made in the preceding paragraphs were made by Defendants' sales personnel and manufacturer's representatives, in the

course of selling the F1807 fittings at issue in this case. The sales and product literature provided by Defendants, Defendants' websites, and Defendants' sales presentations omitted the material facts recited above. Defendants never disclosed the true facts they omitted.

94. Had Defendants not withheld and omitted this material information about the design, reliability, and performance of their F1807 fittings and pex plumbing systems, Plaintiffs, their predecessors, their representatives, and the members of the putative class would not have purchased those products or allowed them to be installed in their homes or properties.

95. No later than 2006, Defendants received notice that their F1807 fittings were failing prematurely.

96. Defendants analyzed the cause of these failures and concluded that the fittings were failing because of stress corrosion cracking and/or dezincification.

97. To date, Defendants have received numerous warranty claims for the failed F1807 fittings.

98. Because of these failures, Defendants have stopped selling F1807 fittings.

99. In recognition of the problems with its choice of high zinc content brass, Uponor now offers different materials for use in its pex plumbing fittings.

#### **Defendants' Defective Plumbing Products Cause Damage to Plaintiffs and Others**

100. In October 2008, Plaintiffs Steve and Kim Spina purchased a home located in Bend, Oregon, which had been built in 2007.

101. During construction of the home, Severson Plumbing, a licensed plumbing company, installed a pex plumbing system in the home. The pex plumbing system installed in the house used the brass fittings marketed and sold by Defendants as described herein.

102. In March 2010, one of the F1807 fittings sold by Defendants broke, releasing water into the home and causing damage to property other than the pex plumbing system.

103. In November 2010, the Spinas submitted a letter to Uponor stating their claim for the costs of repairing the damage and replacing the plumbing system in the house. The Spinas

subsequently provided Uponor with photographs of the broken fitting. Uponor acknowledged that the fitting was Uponor's, but has not agreed to pay the Spinass for the damages they have sustained or for the repair of the system.

104. Plaintiffs, like many class members, have already suffered out-of-pocket costs to repair damage to their homes resulting from the defective fittings. Likewise, plaintiffs and all putative class members have incurred or are reasonably certain to incur the cost of replacing their plumbing systems due to the presence of the Defendants' defective fittings.

105. Plaintiffs and the proposed class members suffered general and specific compensatory and contractual damages including consequential, incidental, loss of use, diminution of value, and attorneys' fees, costs and disbursements.

### **CLASS ACTION ALLEGATIONS**

106. Plaintiffs bring this class action on behalf of themselves and all others similarly situated, for all claims alleged herein, pursuant to Rule 23 of the Federal Rules of Civil Procedure. The proposed class is defined as:

All persons and entities that own a structure located within the State of Oregon that contains a pex plumbing system with F1807 brass insert fittings sold by Uponor or RTI. The proposed class includes, without limitation, all such persons or entities who contacted Defendants or their representatives about Defendants' pex plumbing system and were denied or partially denied warranty coverage and/or replacement of their pex plumbing system.

107. Plaintiffs exclude from the putative class: (1) Defendants or their related entities from the putative class, all subsidiaries or affiliates of Uponor; (2) any entity in which Defendants have a controlling interest; (3) any and all of Defendants' employees, affiliates, legal representatives, heirs, successors or assignees; (4) any person or entity that has previously commenced and concluded a lawsuit against Defendants arising out of the subject matter of this lawsuit; and (5) the judge assigned to this case and any member of the judge's immediate family.

108. Plaintiffs include in the putative class the claims of all persons or entities, like insurance companies, that have paid for the repair, replacement and/or damage caused by prematurely failed brass insert fittings sold by Defendants.

109. Pursuant to Rule 23(a)(1) of the Federal Rules of Civil Procedure, the putative class is so numerous that joinder of all members is impracticable. The number of members of the putative class is believed to be thousands of individuals and/or entities that own properties with Defendants' pex plumbing systems with F1807 brass insert fittings.

110. Pursuant to Rule 23(a)(2) of the Federal Rules of Civil Procedure, the putative class shares questions of law or fact that predominate any individualized issues. The common questions include:

- (a) Were Defendants' brass insert fittings defectively designed for their intended application?
- (b) If so, what is the nature of the design defect?
- (c) Were Defendants' brass insert fittings defectively manufactured?
- (d) Did Defendants fail to warn consumers that the brass insert fittings were not properly tested during the design and development process?
- (e) Did Defendants adequately warn consumers about any types of installations that may cause premature failure of the brass insert fittings?
- (f) Did Defendants make fraudulent, false, deceptive and/or misleading statements in connection with the sale of pex plumbing systems in their product literature, including those relating to standards and reliability?
- (g) Did Defendants omit material information when they sold their pex plumbing systems and F1807 brass insert fittings?
- (h) Did Defendants properly account for foreseeable variations in installation in the development and design of their pex plumbing system and brass insert fittings?
- (i) Did Defendants exercise reasonable care in the design, manufacture and testing of their pex plumbing system and F1807 brass insert fittings?
- (j) Are the brass insert fittings progressively deteriorating at an accelerated rate?
- (k) Will the brass insert fittings fail prematurely?
- (l) Did Defendants deliberately sell or allow brass insert fittings to be distributed after they knew the fittings were failing at an increased rate?

- (m) Did Defendants engage in fraudulent, false, deceptive and/or misleading misconduct with respect to the handling of warranty claims?
- (n) What categories of damages are recoverable for owners of structures with Defendants' pex plumbing systems and brass insert fittings, e.g., replacement, consequential, incidental, or other damages?
- (o) Are Plaintiffs entitled to relief under Defendants' express warranty?
- (p) Can the class obtain a declaration concerning the types and categories of damages and remedies available to putative class members?
- (q) Are Plaintiffs' claims barred in whole or in part by any of Defendants' affirmative defenses?

111. Pursuant to Rule 23(a)(3) of the Federal Rules of Civil Procedure, the claims of the putative class representatives, Plaintiffs, are typical of the class. Plaintiffs and all members of the putative class who own Defendants' defective pex plumbing systems with F1807 brass insert fittings have suffered damages as a result of Defendants' wrongful acts and misconduct. Pursuant to corporate directives, Defendants engaged in a similar pattern of misconduct towards both Plaintiffs and all the other putative class members.

112. Pursuant to Rule 23(a)(4) of the Federal Rules of Civil Procedure, the putative class representatives will fairly and adequately protect the interests of the class. Plaintiffs have no adverse interests to the putative class members. Plaintiffs were sold or installed plumbing systems with defective brass insert fittings. Plaintiffs have retained lawyers who have substantial resources, experience, and success in the prosecution and defense of class action, mass tort and complex litigation, and related insurance coverage and settlement issues.

113. Pursuant to Rule 23(b)(3) of the Federal Rules of Civil Procedure, a class action is a superior method of resolving this action for several reasons. First, the damages of most putative class members are not, in isolation, significant enough to hire an attorney on a contingency or hourly basis. On information and belief, no Attorney General of any state has brought an enforcement action against Defendants to remedy the claims asserted herein. Further, the class members need swift and uniform resolution of their claims before additional damage is



caused by plumbing system failures. In addition, there are likely to be other cases filed against Defendants, and serial adjudications are not efficient, timely, or proper. Individualized judgments and rulings could also result in inconsistent relief for similarly situated plaintiffs and incompatible standards of conduct for Defendants.

### **FIRST CAUSE OF ACTION**

#### **(OREGON UNLAWFUL TRADE PRACTICES ACT-ORS 646.608(1)(u))**

114. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

115. ORS 646.608(1)(u) makes it unlawful for any person to, in the course of business, "engage[] in any... unfair or deceptive conduct in trade or commerce."

116. By making the misrepresentations and failing to disclose material information as set out in ¶¶ 19 through 99 of this Complaint, which are hereby incorporated, Defendants violated and continue to violate ORS 646.608(1)(u).

117. Defendants' wrongful conduct includes, for example:

- (a) Defendants' fraudulent, misleading, and deceptive statements and practices relating to their pex plumbing system and F1807 brass insert fittings;
- (b) Defendants' fraud and misrepresentation by omission, of information about the defective nature of their pex plumbing system and brass insert fittings, the improper design of the products, and Defendants' knowledge of those defects;
- (c) Defendants' failure to disclose the true nature of their defective plumbing system; and
- (d) Defendants' continued sale of F1807 fittings after they knew about problems with their design and manufacture.

118. The licensed plumbing company that installed Defendants' Plumb-Pex system and F1807 fittings in Plaintiffs' home received and relied upon Defendants' misrepresentations and omissions described herein when deciding to purchase and install the system.

119. As a result of Defendants' deceptive conduct relating to the sale of their pex plumbing systems and brass insert fittings, the Plaintiffs and putative class have suffered actual



damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that is damaged from its first use.

120. As a result of Defendants' deceptive conduct, the Plaintiffs and putative class will suffer damages that include not only the full cost to replace their brass insert fittings, but also include consequential and incidental damages.

121. As a direct, proximate, and foreseeable result of Defendants' violation of the statute, the Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

122. Pursuant to ORS 646.638, the Plaintiffs and putative class members are entitled to recover punitive damages as a result of Defendants' malicious and willful conduct.

123. Pursuant to ORS 646.638, the Plaintiffs and putative class members should be awarded its attorney fees and costs incurred in this action.

## **SECOND CAUSE OF ACTION**

### **(OREGON UNLAWFUL TRADE PRACTICES ACT-ORS 646.608(1)(d))**

124. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

125. ORS 646.608(1)(d) makes it unlawful for any person to, in the course of business, "[u]se[] deceptive representations or designations of geographic origin in connection with... goods or services."

126. By making the misrepresentations and failing to disclose material information as set out in ¶¶ 19 through 99 of this Complaint, which are hereby incorporated, Defendants violated and continue to violate ORS 646.608(1)(d).

127. The licensed plumbing company that installed Defendants' Plumb-Pex system and F1807 fittings in Plaintiffs' home received and relied upon Defendants' misrepresentations and omissions described herein when deciding to purchase and install the system.

128. As a result of Defendants' misconduct, Plaintiffs and the putative class members have suffered actual damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that is damaged from its first use.

129. As a result of Defendants' misconduct, Plaintiffs and the putative class members will suffer damages that include not only the full cost to replace their brass insert fittings, but also include consequential and incidental damages.

130. As a direct, proximate, and foreseeable result of Defendants' violation of the statute, the Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

131. Pursuant to ORS 646.638, the Plaintiffs and putative class members are entitled to recover punitive damages as a result of Defendants' malicious and willful conduct.

132. Pursuant to ORS 646.638, the Plaintiffs and putative class members should be awarded its attorney fees and costs incurred in this action.

### **THIRD CAUSE OF ACTION**

#### **(OREGON UNLAWFUL TRADE PRACTICES ACT-ORS 646.608(1)(i))**

133. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

134. ORS 646.608(1)(i) makes it unlawful for any person to, in the course of business, "[a]dvertise[]... goods or services with intent not to provide them as advertised."

135. By making the misrepresentations and failing to disclose material information as set out in ¶¶ 19 through 99 of this Complaint, which are hereby incorporated, Defendants violated and continue to violate ORS 646.608(1)(i).

136. Defendants' wrongful conduct and misrepresentation of the true characteristics, standards, quality, and grade of their pex plumbing systems and F1807 fittings includes, for example:

- (a) Defendants' fraudulent, misleading, and deceptive statements relating to the true characteristics, standards, quality, and grade of their pex plumbing system and their F1807 fittings;
- (b) Defendants' fraud and misrepresentation by omission, of information about the defective nature of Defendants' pex plumbing systems and their F1807 fittings, the improper design of the products, and Defendants' knowledge of those defects, and
- (c) Defendants' concealment of the true nature of their defective plumbing systems.

137. Defendants and their agents and distributors also made untrue, deceptive, and misleading assertions and representations about their pex plumbing systems and their F1807 fittings by making the various statements about the alleged quality of the systems and F1807 fittings referenced herein.

138. The licensed plumbing company that installed Defendants' Plumb-Pex system and F1807 fittings in Plaintiffs' home received and relied upon Defendants' misrepresentations and omissions described herein when deciding to purchase and install the system.

139. As a result of Defendants' untrue, deceptive, and misleading representations and omissions about their pex plumbing systems and the F1807 fittings, Plaintiffs and the putative class members have suffered actual damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that is damaged from its first use.

140. As a result of Defendants' untrue, deceptive, and misleading representations and omissions about their pex plumbing systems and F1807 fittings, Plaintiffs and the putative class members will suffer damages that include not only the full cost to replace their brass insert fittings and plumbing systems, but also include consequential and incidental damages.

141. As a direct, proximate, and foreseeable result of Defendants' violation of the statute, the Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

142. Pursuant to ORS 646.638, the Plaintiffs and putative class members are entitled to recover punitive damages as a result of Defendants' malicious and willful conduct.

143. Pursuant to ORS 646.638, the Plaintiffs and putative class members should be awarded its attorney fees and costs incurred in this action.

#### **FOURTH CAUSE OF ACTION**

##### **(OREGON UNLAWFUL TRADE PRACTICES ACT-ORS 646.608(1)(b))**

144. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

145. ORS 646.608(1)(b) makes it unlawful for any person to, in the course of business, "[c]ause[] likelihood of confusion or misunderstanding as to the source... of ... goods or services."

146. By making the misrepresentations and failing to disclose as set out in ¶¶ 19 through 99 of this Complaint, which are hereby incorporated, Defendants violated and continue to violate ORS 646.608(1)(b).

147. The licensed plumbing company that installed Defendants' Plumb-Pex system and F1807 fittings in Plaintiffs' home received and relied upon Defendants' misrepresentations and omissions described herein when deciding to purchase and install the system.

148. As a result of Defendants' untrue, deceptive, and misleading representations and omissions about their pex plumbing systems and the F1807 fittings, Plaintiffs and the putative class members have suffered actual damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that is damaged from its first use.

149. As a result of Defendants' untrue, deceptive, and misleading representations and omissions about their pex plumbing systems and F1807 fittings, Plaintiffs and the putative class members will suffer damages that include not only the full cost to replace their brass insert fittings and plumbing systems, but also include consequential and incidental damages.

150. As a direct, proximate, and foreseeable result of Defendants' violation of the statute, the Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

151. Pursuant to ORS 646.638, the Plaintiffs and putative class members are entitled to recover punitive damages as a result of Defendants' malicious and willful conduct.

152. Pursuant to ORS 646.638, the Plaintiffs and putative class members should be awarded its attorney fees and costs incurred in this action.

### **FIFTH CAUSE OF ACTION**

#### **(OREGON UNLAWFUL TRADE PRACTICES ACT-ORS 646.608(1)(e))**

153. Plaintiffs and the proposed class members reallege the foregoing paragraphs as though fully set forth herein.

154. ORS 646.608(1)(e) makes it unlawful for any person to, in the course of business, "[r]epresent[] that... goods or services have... characteristics, ingredients, uses, benefits, quantities or qualities that they do not have..."

155. By making the misrepresentations and failing to disclose material information as set out in ¶¶ 19 through 99 of this Complaint, which are hereby incorporated, Defendants violated and continue to violate ORS 646.608(1)(e).

156. The licensed plumbing company that installed Defendants' Plumb-Pex system and F1807 fittings in Plaintiffs' home received and relied upon Defendants' misrepresentations and omissions described herein when deciding to purchase and install the system.

157. As a result of Defendants' misrepresentations and omissions regarding the true characteristics, ingredients, benefits, quantities and qualities of their pex plumbing systems and the F1807 fittings, the Plaintiffs and putative class have suffered actual damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that is damaged from its first use.

158. As a result of Defendants' misrepresentations and omissions, the Plaintiffs and putative class will suffer damages that include not only the full cost to replace their brass insert fittings and plumbing systems, but also include consequential and incidental damages.

159. As a direct, proximate, and foreseeable result of Defendants' violation of the statute, the Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

160. Pursuant to ORS 646.638, the Plaintiffs and putative class members are entitled to recover punitive damages as a result of Defendants' malicious and willful conduct.

161. Pursuant to ORS 646.638, the Plaintiffs and putative class members should be awarded its attorney fees and costs incurred in this action.

#### **SIXTH CAUSE OF ACTION**

##### **(OREGON UNLAWFUL TRADE PRACTICES ACT-ORS 646.608(1)(g))**

162. Plaintiffs and the proposed class members reallege the foregoing paragraphs as though fully set forth herein.

163. ORS 646.608(1)(g) makes it unlawful for any person to, in the course of business, "[r]epresent[] that... goods or services are of a particular standard, quality, or grade... if they are not."

164. By making the misrepresentations and failing to disclose material information as set out in ¶¶ 19 through 99 of this Complaint, which are hereby incorporated, Defendants violated and continue to violate ORS 646.608(1)(g).

165. The licensed plumbing company that installed Defendants' Plumb-Pex system and F1807 fittings in Plaintiffs' home received and relied upon Defendants' misrepresentations and omissions described herein when deciding to purchase and install the system.

166. As a result of Defendants' misrepresentations and omissions regarding the true standard, quality, or grade of their pex plumbing systems and the F1807 fittings, Plaintiffs and the putative class members have suffered actual damages in that they have purchased and have

had installed in homes and structures a plumbing system that is defective and that is damaged from its first use.

167. As a result of Defendants' misrepresentations and omissions, Plaintiffs and the putative class members will suffer damages that include not only the full cost to replace their brass insert fittings and plumbing systems, but also include consequential and incidental damages.

168. As a direct, proximate, and foreseeable result of Defendants' violation of the statute, the Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

169. Pursuant to ORS 646.638, the Plaintiffs and putative class members are entitled to recover punitive damages as a result of Defendants' malicious and willful conduct.

170. Pursuant to ORS 646.638, the Plaintiffs and putative class members should be awarded its attorney fees and costs incurred in this action.

#### **SEVENTH CAUSE OF ACTION (NEGLIGENCE)**

171. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

172. Defendants were negligent in that they failed to use reasonable care when they created, marketed and sold their pex plumbing systems with F1807 fittings.

173. As the manufacturer and/or seller of consumer products, Defendants owed duties to Plaintiffs and the putative class members to provide a safe and quality product and to provide a product that would perform as it was advertised. Defendants breached those duties.

174. As a direct and proximate result of Defendants' negligence, lack of care, and other wrongful acts, Plaintiffs and the putative class members sustained and will sustain damages.



175. As a result of Defendants' negligence, Plaintiffs and the putative class have suffered actual damages in that they have purchased and have had installed in their homes and structures a plumbing system that is defective and that is damaged from its first use.

176. As a result of Defendants' negligence, Plaintiffs and putative class will suffer damages that include not only the full cost to replace their brass insert fittings and plumbing systems, but also include consequential and incidental damages.

177. As a direct, proximate, and foreseeable result of Defendants' negligence, Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

**EIGHTH CAUSE OF ACTION  
(NEGLIGENT FAILURE TO WARN)**

178. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

179. As the manufacturer and seller of a consumer product, Defendants had a duty to provide instructions for proper use of their products.

180. As the manufacturer and seller of a consumer product, Defendants had a duty to warn of foreseeable dangers inherent in the proper use of their products and also had a duty to warn of dangers associated with foreseeable misuse of their products.

181. Defendants became aware through various claims and reports that the F1807 fittings they were selling, distributing, and advertising were subject to premature failures, problems, and deterioration.

182. Despite the fact that Defendants knew their product was defective and their pex systems would not perform as advertised, warranted, or otherwise expressly represented, Defendants continued to sell the products to the public without correction and, in fact, concealed from the public the fact that their pex system and F1807 fittings were defective, not durable, and would begin to fail immediately upon being placed into service.

183. Because the pex plumbing systems related to the habitability of persons' homes, Defendants had a duty to the consumer and to the public to disclose the defective nature of their pex system and not to conceal from Plaintiffs and the putative class members the defective nature of the product.

184. Defendants have engaged in a scheme to cover up the true nature of the problem with their F1807 fittings and pex plumbing systems. This scheme includes Uponor's attempts to keep information about its admissions of the defective nature of the fittings out of the public domain by trying to seal court files and by engaging in replumbing programs for some large homebuilders utilizing secured websites and other methods of communication to preclude others from learning about the problems with the Plumb-Pex systems.

185. To this day, Defendants continue to conceal the true nature of the problems with the F1807 fittings. Many members of the putative class are still unaware that their plumbing system is prematurely failing and will continue to fail due to its design and manufacturing defects.

186. To the extent Defendants claim in this lawsuit (contrary to their prior judicial admissions) that the premature failures of their plumbing systems and brass insert fittings were the result of characteristics of the water chemistry present in Plaintiffs' or the putative class members' water supply, Defendants failed to warn of those characteristics or dangers or provide any instructions, information or warnings about the types of water conditions likely to cause premature failures. As the manufacturer, seller, and distributor of consumer products, Defendants had a duty to provide such information.

187. As a direct, proximate, and foreseeable result of Defendants' failure to warn, Plaintiffs and the putative class have suffered actual damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that has caused damage to property other than the system itself and that is damaged upon its initial use.

188. As a result of Defendants' failure to warn, Plaintiffs and the putative class will suffer damages that include not only the full cost to replace their plumbing systems and brass insert fittings, but also include consequential and incidental damages.

189. As a direct, proximate, and foreseeable result of Defendants' failure to warn, Plaintiffs and putative class members sustained damages, in the aggregate, in excess of \$5 million.

### **NINTH CAUSE OF ACTION (NEGLIGENT MISREPRESENTATION)**

190. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

191. In making material misrepresentations of material facts regarding the characteristics and capabilities of their pex plumbing system through their online and printed advertising and product information, Defendants knew or should have known they were misrepresenting material facts and that Plaintiffs and the putative class (and also Defendants' distributors and installers, and through them, Plaintiffs and the putative class), would be relying on Defendants' representations to their detriment.

192. In concealing material facts regarding the characteristics and capabilities of their pex plumbing systems, Defendants knew or should have known they were not disclosing material facts and that Plaintiffs and the putative class (and also Defendants' distributors and installers and, through them, Plaintiffs and the putative class members) would be relying on Defendants' representations to their detriment.

193. Defendants made the material misrepresentations in the regular course of the business intentionally, recklessly, or without exercising reasonable care in communicating the true characteristics and capabilities of their pex plumbing system, and/or with the intent that Plaintiffs and the putative class members would rely on the false representations and purchase Defendants' pex plumbing systems.

194. As a direct, proximate, and foreseeable result of Defendants' failure to disclose material facts and to misrepresent material facts, Plaintiffs and the putative class have suffered actual damages in that they have purchased and have had installed in homes and structures a plumbing system that is defective and that has caused damage to property other than the system itself and that is damaged upon its initial use.

195. As a result of Defendants' negligent misrepresentations, Plaintiffs and the putative class will suffer damages that include not only the full cost to replace their plumbing systems and brass insert fittings, but also include consequential and incidental damages.

196. As a direct, proximate, and foreseeable result of Defendants' negligent misrepresentations, Plaintiffs and the putative class members sustained damages, in the aggregate, in excess of \$5 million.

**TENTH CAUSE OF ACTION  
(BREACH OF EXPRESS WARRANTIES)**

197. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

198. Defendants made certain express warranties to distributors, plumbers, and consumers about the goods they would provide.

199. The express warranties provided by Defendants included warranties that Defendants would provide properly designed and manufactured plumbing systems and a lengthy warranty on such systems. Defendants also made numerous other express warranties as previously set forth in this Complaint.

200. Plaintiffs' representatives, plumbing distributors, plumbers, and the putative class members and their representatives relied upon Defendants' express warranties.

201. Defendants breached such express warranties by providing defective plumbing systems that have failed or are reasonably certain to fail before the warranted or useful life of the system. Defendants also breached their warranties to Plaintiffs and the putative class by refusing

to honor their express warranties when presented with claims and damage covered by the terms of the warranty.

202. As a direct, proximate, and foreseeable result of Defendants' breach of express warranty, Plaintiffs and the putative class members sustained damages, in the aggregate, in excess of \$5 million.

**ELEVENTH CAUSE OF ACTION  
(DECLARATORY AND INJUNCTIVE RELIEF)**

203. Plaintiffs and the putative class members reallege the foregoing paragraphs as though fully set forth herein.

204. Pursuant to Rule 23(b)(2) of the Federal Rules of Civil Procedure and any applicable statute or rule providing for declaratory and/or injunctive relief, Plaintiffs and the putative class members seek a declaratory judgment as follows:

- (a) To the extent Defendants allege that any limitations, restrictions, or disclaimers of express warranty preclude full recovery of damages, the warranties fail in their essential purpose because the remaining remedies provided therein are inadequate and deprive the class of the benefit of the bargain of their purchases, because Defendants at the time of sale and thereafter concealed that the systems were defective, and because the provisions are otherwise unconscionable;
- (b) To the extent Defendants allege that any limitations, restrictions, or disclaimers of express warranty preclude full recovery of damages, the same is unconscionable because the warranties do not provide adequate remedies because the defect in the plumbing systems is latent and because the Plaintiffs lack sufficient bargaining power;
- (c) To the extent Defendants allege that any limitations, restrictions, or disclaimers of implied warranty preclude full recovery of damages, the same is unlawful and unenforceable;
- (d) To the extent Defendants allege that any limitations, restrictions, or disclaimers of implied warranty preclude full recovery of damages, the same is barred by Defendants' failure to provide the alleged warranty disclaimers at the time of sale of the product;
- (e) Any releases obtained by Defendants, that did not otherwise provide full compensation to the putative class, were fraudulently induced, are unconscionable, were obtained by suppression and concealment, were obtained

under duress by persons needing to repair their plumbing systems, and are null and void; and

- (f) To the extent Defendants have had an adverse adjudication against them arising from the subject matter of this Complaint, that the putative class may use offensive collateral estoppel against Defendants for the rulings and determinations therein.

### **PRAYER FOR RELIEF**

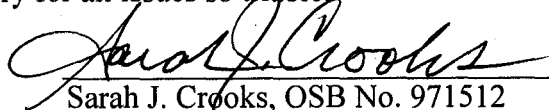
WHEREFORE, Plaintiffs, on behalf of themselves and all others similarly situated, pray for relief against Defendants as follows:

1. Certification of this matter as a class action and appointing Plaintiffs and their counsel to represent the class;
2. Compensation for damages suffered by Plaintiffs and the putative class members;
3. Award of reasonable attorneys' fees and costs and disbursements incurred herein;
4. Award of punitive damages;
5. Enjoin Defendants from denying warranty claims for failed F1807 fittings;
6. Declaring the rights and obligations of the parties as prayed for; and
7. Such other and further relief the Court deems just and equitable.

### **JURY DEMAND**

Plaintiffs hereby demand a trial by jury for all issues so triable.

DATED: March 2, 2011



Sarah J. Crooks, OSB No. 971512

SCrooks@perkinscoie.com

**Perkins Coie LLP**

1120 N.W. Couch Street, Tenth Floor

Portland, OR 97209-4128

Telephone: 503.727.2000

Facsimile: 503.727.2222

Attorneys for Plaintiffs

IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF TEXAS  
HOUSTON DIVISION

UPONOR, INC.

Plaintiff,

vs.

UNIQUE INDUSTRIAL PRODUCT  
COMPANY,

Defendant

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CASE NO. 07-2986

PLAINTIFF'S AMENDED COMPLAINT

NOW COMES Plaintiff UPONOR, INC. (hereinafter "UPONOR") and files this Amended Complaint against Defendant UNIQUE INDUSTRIAL PRODUCT COMPANY (hereinafter "UNIQUE") and respectfully shows as follows:

PARTIES

1. RTI Piping Systems ("RTI") was a company located at 11 Farber Drive, Bellport, N.Y. 11713. RTI was engaged in the business of supplying/distributing various plumbing products including, but not limited to, brass Fittings and toilet Swivel Nuts.

2. At all times relevant, Plaintiff UPONOR was and is a corporation incorporated in Illinois with its principal place of business located at 5925 148th Street West, Apple Valley, Minnesota. UPONOR was and is both a citizen and a resident of Minnesota. UPONOR is engaged in the business of supplying/distributing various plumbing products including, among other products, brass plumbing Fittings as well as toilet Swivel Nuts, and was authorized to conduct business in Texas.



3. UPONOR and RTI were related companies. In or about December 2004 UPONOR began receiving deliveries of RTI's inventory of products, including SSC Fittings and toilet Swivel Nuts. In or about December 2004 UPONOR agreed to honor RTI's warranty obligations relating to parts supplied/distributed by RTI, including brass Fittings and Swivel Nuts.

4. Upon information and belief, at all times relevant, Defendant UNIQUE was and is a Texas corporation with its principal place of business located at 12600 Cardinal Meadows, Sugarland, Texas, and was acting as a domestic agent, apparent manufacturer, importer, supplier/distributor and marketer of plumbing products including, among other products, ASTM F1807 brass plumbing Fittings and polyacetyl toilet Swivel Nuts. At all times relevant, UNIQUE was doing business in the State of Texas, and was both a citizen and a resident of Texas.

#### **JURISDICTION AND VENUE**

5. This Court has original jurisdiction of this action pursuant to 28 U.S.C. Section 1332 because there is complete diversity of citizenship between the parties and the amount in controversy exceeds the sum of \$75,000.00, exclusive of interest and costs.

6. Venue is proper in this jurisdictional district pursuant to 28 U.S.C. Section 1391(a)(2) and (f)(1) as UNIQUE is doing business in this jurisdictional district.

#### **PRELIMINARY ALLEGATIONS**

7. On or about July 31, 2002 RTI began doing business with UNIQUE and submitted a purchase order for brass pex Fittings. In August 2002, in e-mails and telefaxes, RTI required, and UNIQUE agreed, that the brass pex Fittings to be supplied by UNIQUE would have various markings including: F1807, P-PEX and NSF-pw. Subsequent to the August 2002

date UNIQUE was instructed to, and did, mark the Fittings sold to RTI and UPONOR with the additional designation "US-PW".

8. The F1807 designation is made pursuant to the American Society of Mechanical Engineers (ASTM) standards which relate, in part, to metal (brass) insert Fittings for use with Pex tubing. Pursuant to sub-paragraph 11.1 of F1807-045 when a product, or product packaging, is marked with the ASTM designation F1807 the product is represented to have been manufactured, tested, inspected and sampled in accordance with F1807 and has been found to meet F1807 requirements.

9. ASTM F1807-045 references B283 Specifications for Copper and Copper-Alloy Die Forgings which encompasses the brass Fittings supplied by UNIQUE. The B283 Specifications provide among other points, in paragraph 7 that forgings, including the Fittings supplied by UNIQUE shall conform to the chemical composition requirements set forth in Table 1 attached to B283.

10. UNIQUE selected Duksan Metal Co. of Korea to design, engineer and manufacture the Fittings. Neither RTI nor UPONOR participated in the selection of Duksan nor did they have contact with Duksan relating to the means, methods or circumstances regarding the manufacture of the Fittings. The Fittings were delivered by Duksan to UNIQUE.

11. On information and belief UNIQUE did not have a representative present at Duksan's facility on a full time basis to monitor the manufacturing process and ensure that the production runs, as opposed to prototype product, was in compliance with ASTM and industry standards.

12. Subsequent to its commitment in July 2002 to supply brass Fittings to RTI, UNIQUE agreed to provide RTI and UPONOR with Swivel Nuts.

13. UNIQUE chose Duksan to engineer, design and manufacture the Swivel Nuts. Duksan sub-contracted part of the work on the Swivel Nuts. On information and belief UNIQUE never inspected the Swivel Nut sub-contractor's facility, never investigated the qualifications of the sub-contractor and never monitored the sub-contractor's work.

14. Neither RTI nor UPONOR knew who the Swivel Nut sub-contractor was, nor how the Swivel Nuts were being manufactured.

15. During or before June 2004 UNIQUE was placed on notice by UPONOR of failures of Swivel Nuts, the fact that UNIQUE's competitors' nuts were not failing and that UPONOR was losing business as a result of this situation.

16. Subsequent to June 2004, UNIQUE began supplying other Swivel Nuts to UPONOR (the "post June 2004 nuts"). UNIQUE did not monitor or supervise production of the post June 2004 nuts, did not test the post June 2004 nuts before supplying them to UPONOR to determine what degree of porosity was present in the walls of the nuts, nor did UNIQUE examine the thread pattern of the nuts for deficiencies.

17. The Swivel Nuts were purchased from UNIQUE, by RTI and UPONOR, with the intent and understanding that those Swivel Nuts would be further distributed by RTI and UPONOR to other entities for installation in residential plumbing systems. During and after the discussions/negotiations relating to the sale of the Swivel Nuts, UNIQUE understood that RTI and UPONOR would be acting as intermediate distributors of the Swivel Nuts and would be passing that product along to wholesalers and end users without any changes to the product.

18. During and after the discussions/negotiations relating to the sale of the Swivel Nuts, UNIQUE presented itself to RTI and UPONOR as knowledgeable regarding that product, represented that it was in the business of selling such products, and RTI and UPONOR relied on

UNIQUE's experience and knowledge relating to the Swivel Nuts. Further, UNIQUE agreed to provide goods that were free from defects in workmanship, materials, or design, and which were merchantable and fit for their intended purpose of incorporation into residential plumbing systems.

19. Pursuant to the understandings and agreements set forth in paragraphs 17 and 18 above, UNIQUE began shipping the subject Swivel Nuts to RTI and UPONOR.

20. Prior to the date on which RTI and UPONOR began purchasing the Swivel Nuts from UNIQUE, RTI and UPONOR had entered into agreements with various wholesalers to supply Swivel Nuts for use in residential plumbing throughout the United States. Subsequent to the date of UNIQUE's sale of the Swivel Nuts to RTI and UPONOR, RTI and UPONOR supplied UNIQUE's Swivel Nuts to other entities, including wholesalers. RTI and UPONOR made no changes or alterations to UNIQUE's Swivel Nuts and simply re-distributed UNIQUE's product in the same condition in which it was supplied by UNIQUE.

21. Subsequent to RTI's and UPONOR's distribution of the Swivel Nuts, UPONOR received notice from a builder/contractor, Palm Harbor, as well as individuals that certain of the Swivel Nuts were failing during and after installation in residences.

22. At various times, beginning in July 2002, RTI and UPONOR purchased from UNIQUE, pursuant to multiple purchase orders, ASTM F1807 brass plumbing Fittings ("Fittings") with the intent and understanding that those Fittings would be further distributed by RTI and UPONOR to wholesalers for installation in residential plumbing systems.

23. UPONOR's purchases of Fittings from UNIQUE occurred at various times including, but not limited to, the fall of 2004 and were made, pursuant to multiple purchase orders. Sample copies of UPONOR Purchase Orders, relating to the Fittings, issued to UNIQUE

are attached hereto as Exhibit "A." These Fitting Purchase Orders were subject to UPONOR's standard Purchasing Terms and Conditions attached hereto as Exhibit "B."

24. During and after the discussions/negotiations relating to the sale of the Fittings UNIQUE understood that RTI and UPONOR would be acting as intermediate distributors of the Fittings and would be passing that product along to wholesalers and end users without any changes to the product.

25. During and after the discussions/negotiations relating to the sale of the Fittings, UNIQUE presented itself to RTI and UPONOR as knowledgeable regarding that product, represented that it was in the business of selling such products, and RTI and UPONOR relied on UNIQUE's experience and knowledge relating to the Fittings. Further, UNIQUE agreed to provide goods that were free from defects in workmanship, materials, and design, and which were merchantable and fit for their intended purpose of incorporation into residential plumbing systems.

26. Prior to the date on which RTI and UPONOR purchased the Fittings from UNIQUE, RTI and UPONOR entered into separate agreements with various entities to supply them with the Fittings, including wholesalers, plumbers as well as builders/contractors who installed them into residences throughout the United States. RTI and UPONOR made no changes or alterations to UNIQUE's Fittings and simply re-distributed UNIQUE's product in the same condition in which it was supplied by UNIQUE.

27. Pursuant to Paragraph 11 of the Terms and Conditions applicable to the Fitting Purchase Orders, UNIQUE agreed to indemnify UPONOR and "hold and save [UPONOR] from and against any and all claims, demands, liabilities, losses or expenses of whatsoever in kind and nature which [UPONOR] shall or may at any time sustain or incur by reason of, in consequence

of, or arising out of the manufacture, sale or delivery by [UNIQUE] of the goods and/or services described in this Purchase Order.”

28. Pursuant to Paragraph 31 (Warranty Specifications) of the Terms and Conditions for the Fitting Purchase Orders, UNIQUE further “expressly warrant[ed] that all goods and/or services, and workmanship with respect to the goods, covered by the Purchase Order or other description, drawings, specifications or samples furnished by [UNIQUE] will be in exact accordance with such Purchase Order, description, drawings, specifications or samples and free from defects in design (except to the extent such defective design is attributable to [UPONOR]), materials and workmanship and will be merchantable and fit for a particular purpose(s).”

29. Subsequent to UPONOR purchasing Swivel Nuts from UNIQUE, Palm Harbor and individuals informed UPONOR of multiple Swivel Nut failures, demanded reimbursement from UPONOR for the damages they claim to have sustained as a result of the defective Swivel Nuts and also demanded replacement of all UNIQUE Swivel Nuts contained in the approximately 5,000 Palm Harbor homes in which UNIQUE’s Swivel Nuts had been installed.

30. Prior to August 24, 2006, UPONOR began receiving notices of failures of certain Fittings supplied by UNIQUE which had been incorporated into plumbing systems in various residential properties, which failures resulted in water damage.

31. On or about August 24, 2006 representatives of UPONOR met with representatives of UNIQUE to discuss the Swivel Nut and Fitting failures.

32. At the August 24, 2006 meeting UNIQUE agreed “that it will be responsible for any claims arising out of defective product.” A copy of the August 28, 2006 e-mail from UNIQUE to UPONOR confirming that agreement is attached hereto as Exhibit “C”.

33. At the August 24, 2006 meeting UNIQUE agreed that in exchange for UPONOR agreeing to "take the remaining inventory" UNIQUE "will take responsibility for these parts regarding quality and conformity to specifications." See Exhibit "C".

34. At the August 24, 2006 meeting UNIQUE agreed with respect to the Swivel Nuts, to pay for 50% of the then existing claims. It was also agreed at the August 24, 2006 meeting that an inquiry would be made of Palm Harbor related to the cost of pro-actively replacing all of the UNIQUE supplied Swivel Nuts. See Exhibit "C".

35. In an e-mail dated September 15, 2006, from UNIQUE to UPONOR, UNIQUE stated that "[a]s agreed during our meeting you will take our inventory and in return we will take care of the existing claims plus stand behind any future claims." A copy of the September 15, 2006 e-mail is attached hereto as Exhibit "D".

36. In the September 15, 2006 e-mail, UNIQUE stated that "our product meets all the requirements of F1807 except the lead which is a little lower. It is for this that we are standing behind our product in case there are any claims etc.". See Exhibit "D".

37. In an e-mail of September 11, 2006, regarding the current inventory of product in stock in Houston, currently "on water" and ready for shipment from "overseas", UNIQUE stated that " .. should there be any non-conforming product, UNIQUE will issue an immediate credit to UPONOR". See the e-mail of Hetal Bhavsar of September 11, 2006 attached hereto as Exhibit "E".

38. On or about October 4, 2006 UPONOR released Purchase Order #825548 covering UNIQUE inventory. UNIQUE agreed to the terms of the offer relating to Purchase Order #825548. See Purchase Order #825548 attached hereto as Exhibit "F" and the e-mail from UNIQUE (Jay Milani) dated October 9, 2006 attached hereto as Exhibit "G".



39. In the e-mail of October 9, 2006 Mr. Milani states that UNIQUE will "... cooperate fully and take care of claims and put this issue behind us." See Exhibit "G".

40. Purchase Order #825548 provides that acceptance of the product listed on the Purchase Order "is subject to the attached UPONOR, Inc. terms and conditions and the product meeting UPONOR's quality testing, F1807 standards and all applicable represented standards." See Exhibit "F". See Exhibit "B" for the terms and conditions referred to in Exhibit "F".

41. Pursuant to Paragraph 11 of the Terms and Conditions applicable to the UPONOR Purchase Order UNIQUE agreed to indemnify UPONOR and "hold and save [UPONOR] from and against any and all claims, demands, liabilities, losses or expenses of whatsoever in kind and nature which [UPONOR] shall or may at any time sustain or incur by reason of, in consequence of, or arising out of the manufacture, sale or delivery by [UNIQUE] of the goods and/or services described in this Purchase Order."

42. Pursuant to Paragraph 31 (Warranty Specifications) of the Terms and Conditions UNIQUE further "expressly warranted that all goods and/or services, and workmanship with respect to the goods, covered by the Purchase Order or other description, drawings, specifications or samples furnished by [UNIQUE] will be in exact accordance with such Purchase Order, description, drawings, specifications or samples and free from defects in design (except to the extent such defective design is attributable to [UPONOR]), materials and workmanship and will be merchantable and fit for a particular purpose(s)."

43. In August of 2006, UPONOR was in contact with various individuals and entities regarding the failures of the Fittings and Swivel Nuts that UNIQUE sold to UPONOR and, as a result of the failures, the Fittings and Swivel Nuts were removed from the inventory of those individuals and entities and returned to UPONOR.

44. UNIQUE's Fittings were supplied through a distribution chain to end users, including a builder named Ryan Homes, a subsidiary of NVR, Inc. Ryan Homes had discovered that UNIQUE's Fittings installed in residences constructed by it were failing, and made a demand that the Fittings be replaced.

45. Ryan Homes has claimed that it incurred damages resulting from Fitting failures. These damages related to the costs and expenses associated with the removal and replacement of the Fittings installed in select residences in Virginia.

46. On or about November 29, 2006 UPONOR, both orally and in writing, put UNIQUE on notice of claims that had been made by Ryan Homes regarding the replacement of ASTM F1807 Fittings supplied by UNIQUE and the demand by Palm Harbor Homes for replacement of Swivel Nuts supplied by UNIQUE. A copy of the November 29, 2006 e-mail of Sheila King of UPONOR to Hetal Bhavsar of UNIQUE is attached hereto as Exhibit "H". UNIQUE has refused to pay for the replacement of the Fittings and Swivel Nuts.

47. UPONOR has paid the damages claimed by Ryan Homes and has presented a claim to UNIQUE pursuant to the agreement UNIQUE made with UPONOR for reimbursement of the sums that UPONOR paid as a result of the failure of UNIQUE's Fittings. UNIQUE has failed to make reimbursement to UPONOR for these sums.

48. UPONOR has tendered all known manufacturing defect related claims for Fittings and Swivel Nuts to UNIQUE relative to costs that it has incurred thus far and/or will incur as a result of the defective Fittings and Swivel Nuts that UNIQUE sold to RTI and UPONOR.

49. Palm Harbor has also made demand upon UPONOR for all costs and expenses associated with the removal and replacement of Swivel Nuts installed in its homes throughout

the United States. UPONOR, in turn, presented a claim to UNIQUE for the sums being sought by Palm Harbor. UNIQUE has failed to honor and pay UPONOR's claim.

50. To date, UPONOR has paid in excess of \$75,000 in connection with claims by Palm Harbor relating to Swivel Nuts, over \$75,000 to Ryan Homes/NVR in connection with its claims for defective Fittings and over \$75,000 to third parties for payment of swivel nut and fitting claims despite the fact that UPONOR is an innocent seller which did not manufacture the Fittings and Swivel Nuts and made no alterations or modifications to the products supplied by UNIQUE.

51. Since mid-2006, UPONOR has sought, with no success, reimbursement and/or tendered claims to UNIQUE relative to Fitting and Swivel Nut failures.

52. UNIQUE has failed to accept claims and/or reimburse UPONOR for payments made relative to Fittings and Swivel Nut failures.

53. At present, UPONOR has sustained damages in the form of honoring warranty claims, related costs and expenses incurred as a result of defects and deficiencies in UNIQUE products, as well as the complained of acts and/or omissions of UNIQUE. In addition, UPONOR may lose future business and profits from various entities as a result of the deficiencies in the Fittings and Swivel Nuts supplied by UNIQUE.

### COUNT I

#### *(Breach of Contract)*

54. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. Pursuant to the language of the written e-mails

referenced herein and exchanged between UNIQUE and UPONOR, UNIQUE agreed to take responsibility for all claims, present and future relating to products it had sold UPONOR.

55. Pursuant to the Standard Terms and Conditions governing the purchase orders, UNIQUE agreed to indemnify UPONOR in connection with any claims or demands arising out of the products supplied to UPONOR by UNIQUE.

56. In exchange for UNIQUE's promise to stand behind claims made relating to its products, UPONOR agreed to take all of the UNIQUE inventory identified on Purchase Order 825548 that met the criteria specified/referenced on the Purchase Order. UNIQUE agreed to these terms.

57. Pursuant to the communications between UNIQUE and RTI in July and August 2002, UNIQUE agreed to supply Fittings that complied with ASTM F1807 standards.

58. Pursuant to the language of the purchase orders exchanged between UPONOR and UNIQUE including, but not limited to, Purchase Order #825548 and the terms and conditions incorporated therein, UNIQUE agreed to supply and/or manufacture products which were fit for their intended purpose, merchantable and reasonable for consumer installations.

59. As domestic agent for a foreign manufacturer of the products at issue, and as a distributor of the products involved in this matter, UNIQUE held itself out as being knowledgeable, skilled and competent in the business of manufacturing and supplying Fittings and Swivel Nuts and represented that the Fittings and Swivel Nuts would be manufactured in a good and workmanlike manner, and fit for their intended purpose.

60. Pursuant to the Standard Terms and Conditions governing the purchase orders exchanged between UPONOR and UNIQUE including, but not limited to, Purchase Order #825548, as well as UNIQUE's e-mails to UPONOR, UNIQUE agreed to indemnify UPONOR

in connection with any claims or demands arising out of the products supplied to UPONOR or RTI by UNIQUE.

61. UNIQUE breached its agreement with UPONOR in one or more of the following respects because UNIQUE:

- a) defectively manufactured the subject Fittings and Swivel Nuts;
- b) failed to take reasonable steps to ensure that the Fittings would not be subject or prone to fracturing post-manufacture in expected and intended residential use;
- c) failed to take reasonable steps to ensure that the Swivel Nuts would not be subject or prone to fracturing post-manufacture in expected and intended residential use;
- d) failed to properly test, inspect and evaluate the Fittings and Swivel Nuts prior to distributing those products to determine that they were suitable and fit for installation in residential plumbing systems;
- e) supplied RTI and UPONOR with Swivel Nuts and Fittings that were not merchantable, or suited for their reasonable, expected and intended use in residential plumbing systems, and which were not free from defects in materials, design and workmanship;
- f) failed, despite repeated demands by UPONOR, to indemnify UPONOR for the costs and expenses incurred in connection with failures of products supplied by UNIQUE to UPONOR, which products have been injected into the stream of commerce by UNIQUE;
- g) failed to supply Fittings that complied with ASTM standard F1807 and the chemical composition requirements specified in attachments thereto;
- h) failed to abide by its agreement to "stand behind" and pay for present and future claims relating to products it sold; and
- i) otherwise breached its Agreements with RTI and UPONOR.

62. At all times relevant, UPONOR fulfilled all obligations and/or responsibilities that it had and which arose out of the agreements with UNIQUE for the products at issue.

63. As a direct and proximate result of the aforementioned breaches of the Agreements by UNIQUE, UPONOR has sustained damages within the jurisdictional limits of this Court.

## COUNT II

### *(Breach of Express Warranty of Merchantability)*

64. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. Pursuant to UNIQUE's agreement to produce and supply Fittings that complied with ASTM F1807 standards, UNIQUE's agreement to manufacture and supply Swivel Nuts that conform to industry standards, and under the Terms and Conditions governing the Fitting and Swivel Nuts under UPONOR purchase orders, UNIQUE warranted that the design and the manufacture of the subject Fittings and Swivel Nuts was in accordance with recognized and sound engineering principles, as well as industry standards and that those products were in a good and merchantable condition such that the Fittings and Swivel Nuts were reasonably fit for the ordinary purposes for which they were intended to be used.

65. The subject Fittings supplied by UNIQUE were not in a good and merchantable condition upon receipt by UPONOR since they were susceptible to failure due to fracturing from various causes including poor microstructure, pre-existing cracks and deficient chemical composition.

66. The subject Swivel Nuts supplied by UNIQUE were not in a good and merchantable condition upon receipt by UPONOR since they had excessive porosity in the walls of the nuts and the threads were not properly manufactured.

67. As a direct and proximate result of the aforementioned breach of express warranty by UNIQUE, UPONOR sustained damages.

**COUNT III**

***(Breach of Implied Warranty of Merchantability)***

68. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. At all times relevant, and in accordance with the provisions of Section 2.314(a) of the Texas Business and Commerce Code UNIQUE, as the apparent manufacturer of the goods/products at issue, and being a merchant/seller with respect to those products/goods, impliedly warranted that the design and manufacture of the subject Fittings and Swivel Nuts was done in a fashion that left those products in a good and merchantable condition so that the Fittings and Swivel Nuts were reasonably fit for the ordinary purposes for which they were intended and would pass without objection in the trade.

69. The subject Fittings and Swivel Nuts supplied by UNIQUE were not in a good and merchantable condition when they were supplied to UPONOR, were not fit for the ordinary purposes for which such goods are used, and would not pass without objection in the trade as evidenced by multiple failures of the goods when put to their ordinary and intended uses.

70. UPONOR duly and reasonably relied on the skill and judgment of UNIQUE as the apparent manufacturer of the goods, as a merchant/seller of the goods and as a marketer of the goods, in connection with the design, manufacture and supply of the Fittings and Swivel Nuts which were to be merchantable when supplied to UPONOR.

71. As a direct and proximate result of the aforementioned breach of implied warranty by UNIQUE, UPONOR has sustained damages.



COUNT IV

*(Breach of Implied Warranty of Fitness for a Particular Purpose)*

72. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. At all times relevant, and in accordance with the relevant provisions of Section 2.315 of the Texas Business and Commercial Code, UNIQUE was a seller/merchant with respect to the goods at issue, had reason to know of the particular purpose for which the goods were needed, and had reason to know that UPONOR was relying on UNIQUE's skill or judgment to select or furnish suitable goods, thereby giving an implied warranty that the subject Fittings and Swivel Nuts were fit for their particular purpose and/or use and that the Fittings and Swivel Nuts were suitable to be incorporation into residential plumbing systems under expected and anticipated conditions.

73. Notwithstanding the foregoing warranty, the Fittings supplied by UNIQUE were not fit for their particular purpose or use as they experienced multiple failures for various reasons including, but not limited to, their poor microstructure and pre-existing cracks.

74. The Swivel Nuts supplied by UNIQUE were not fit for the particular purpose or use for various reasons including, but not limited to, excessive porosity and defective machining of their threads.

75. UPONOR and prior to it RTI, duly and reasonably relied on the skill and judgment of UNIQUE, as the apparent manufacturer, seller and marketer of the goods, to supply Fittings and Swivel Nuts which were fit for their intended and particular purpose and use.

76. As a direct and proximate result of the unfit condition of the subject Fittings and Swivel Nuts, multiple failures of those products occurred, causing damage to UPONOR.

COUNT V

*(Common Law Indemnity)*

77. UPONOR realleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. UNIQUE was the apparent manufacturer of the Fittings and Swivel Nuts involved in this matter and so held itself out to companies in the market for such products, including RTI and UPONOR.

78. On information and belief, UNIQUE was the importer, distributor and marketer of the Fittings and Swivel Nuts involved in this matter, and UNIQUE was the entity that placed the Fittings and Swivel Nuts into the stream of commerce causing UPONOR to sustain damages when those products failed.

79. Neither RTI nor UPONOR made any changes or alterations to the Fittings and Swivel Nuts at issue in this matter, and was an innocent retailer in the chain of distribution of the Fittings and Swivel Nuts.

80. As a result of multiple failures of the Fittings and Swivel Nuts, claims for damages have been made and directed to UPONOR as a "down stream" participant in the chain of distribution of the goods at issue. Notwithstanding its role as an innocent retailer in the chain of distribution, UPONOR has incurred expenses in connection with such claims including, but not limited to, payment of property damage claims due to the failure of the UNIQUE products.

81. UPONOR has made demand upon UNIQUE for reimbursement of sums spent in connection with these claims and UNIQUE has failed to honor UPONOR's demand.

82. As a result of their relative positions in connection with the manufacture, sale and distribution of the products at issue, UPONOR is entitled to be indemnified by UNIQUE for

damages it has incurred as a result of the failures of Fittings and Swivel Nuts placed into the stream of commerce by UNIQUE.

#### COUNT VI

##### *(Breach of Express Indemnity)*

83. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. Under the terms of the e-mails exchanged between UNIQUE and UPONOR, UNIQUE agreed to pay for claims relating to failures of Swivel Nuts and Fittings. Furthermore, pursuant to the terms and conditions which form a part of and govern the Purchase Orders exchanged by UPONOR and UNIQUE, UNIQUE agreed to indemnify UPONOR for any and all claims, liabilities, losses or expenses arising out of the sale of the Fittings and Swivel Nuts.

84. UPONOR sold the Fittings and Swivel Nuts to various entities, and as a result of the failure of those products, UPONOR has received claims, and has incurred liabilities, losses, costs and expenses.

85. Pursuant to the indemnity obligations referred to above, UPONOR tendered all claims, liabilities, losses, costs and expenses to UNIQUE.

86. To date, UNIQUE has failed and refused to reimburse UPONOR, resulting in UPONOR sustaining damages.

#### COUNT VII

##### *(Strict Products Liability — Defective Product)*

87. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. At all times relevant, UNIQUE was engaged in the

business of selling, marketing, and distributing the Fittings and Swivel Nuts involved in this matter, and it was expected that the Fittings and Swivel Nuts would reach the ultimate user or consumer without substantial change in the condition in which those products were sold. The Fittings and Swivel Nuts sold, marketed and distributed by UNIQUE did reach the ultimate user or consumer in the condition in which those products were sold by UNIQUE.

88. The Fittings and Swivel Nuts involved in this matter were defective and unreasonably dangerous at the time they were sold by UNIQUE as the construction and quality of the Fittings and Swivel Nuts deviated from the specifications and/or planned output of those products in various ways including, but not limited to, failing to comply with ASTM F1807 standards including chemical composition, poor micro-structure and preexisting cracks in the Fittings and preexisting cracks, excessive porosity and deficiencies in the machining of the threads in the Swivel Nuts, rendering both types of products unreasonably dangerous. These defects existed at the time the Fittings and Swivel Nuts left the possession of UNIQUE and caused UPONOR to sustain damages as a result of the failures of the Fittings and Swivel Nuts.

89. As a direct and proximate result of the defective and unreasonably dangerous condition of the Fittings and Swivel Nuts, those products failed, causing water damage to residences following the installation of those products as part of the residential plumbing systems, and requiring the removal of those products due to a heightened failure potential.

90. As a direct and proximate result of the defective and unreasonably dangerous condition of the Fittings and Swivel Nuts, multiple failures of those products occurred, causing UPONOR to sustain damages, and UPONOR is likely to continue to sustain damages in the future.

**COUNT VIII*****(Negligence)***

91. UPONOR re-alleges and incorporates Paragraphs 1 through 53 of the Amended Complaint as though fully set forth herein. UNIQUE, as the apparent manufacturer, seller, distributor and marketer of the products involved in this matter owed a duty to UPONOR to provide it with products that were merchantable, fit for their intended and foreseeable purposes/uses and which were manufactured in accordance with reasonable and recognized industry standards.

92. On information and belief, on and prior to August 24, 2006, UNIQUE knew of problems with the type of pex Fittings supplied by it to RTI and UPONOR and prior to that date had changed the style of pex Fittings supplied to competitors of UPONOR, but failed to notify UPONOR or make a similar change relating to product being supplied to UPONOR.

93. UNIQUE breached its duty to UPONOR in connection with the Fittings and Swivel Nuts it sold to UPONOR in one or more of the following ways:

- a) defectively manufactured the subject Fittings and Swivel Nuts in various ways including, but not limited to, creating the presence of poor microstructure and cracks, excessive porosity and deficient thread structured patterns;
- b) distributed/sold Fittings and Swivel Nuts which were cracked, structurally unsound, not fit for ordinary use in residential plumbing system, and which were not fit for their intended purposes;
- c) failed to take reasonable steps to ensure that the Fittings would not be subject or prone to fracturing post manufacture in expected and intended residential use;

- d) failed to take reasonable steps to ensure that the Swivel Nuts would not be subject or prone to fracturing post manufacture in expected and intended residential use;
- e) failed to properly test, inspect and evaluate the Fittings and Swivel Nuts prior to distributing those products to determine that they were suitable and fit for installation in residential plumbing systems.
- f) continued to distribute/sell Swivel Nuts and Fittings that were not suitable for their reasonable, expected and intended use in residential plumbing systems after it knew or in the exercise of reasonable care should have know of the deficiencies or defects in those products;
- g) failed to monitor the manufacturing process to ensure that there was not excessive porosity in the walls of the Swivel Nuts;
- h) failed to monitor the production of the Fittings to ensure that the proper chemical composition was present and that the machining and washing process was correctly done;
- i) failed to advise UPONOR that it had made changes to the manufacturing and/or design of the Fittings sold to certain of UPONOR's competitors at the same time UNIQUE continued to sell those Fittings to UPONOR; and
- j) otherwise acted in a careless and negligent fashion in connection with the distribution and sale of the Fittings and Swivel Nuts.

94. As a direct and proximate result of the negligent acts and omissions of UNIQUE with respect to the Fittings and Swivel Nuts, those products failed, causing water damage to residences following the installation of those products as part of residential plumbing systems, and also caused UPONOR damage by making it necessary to pro-actively replace Fittings and Swivel Nuts.

95. As a direct and proximate result of the negligent acts and omissions of UNIQUE, which have caused or contributed to the multiple failures of the products involved in this matter, UPONOR has sustained damages and is likely to continue to sustain damages in the future.

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiff UPONOR, INC. respectfully requests that Defendant be cited to appear and that this Court enter judgment for Plaintiff and against Defendant UNIQUE INDUSTRIAL PRODUCT COMPANY in an amount to be determined by the trier of fact, together with interest, costs, and attorney's fees. Plaintiff also respectfully requests any other and further relief as the Court deems just and equitable to which Plaintiff may be entitled.

Respectfully submitted,

SHANNON, GRACEY, RATLIFF & MILLER, L.L.P.

By: Howard L. Fieber  
Joseph R. Little  
State Bar No. 00784483  
Southern District of Texas Bar No. 15972  
1301 McKinney Street, Suite 2920  
Houston, Texas 77010  
(713) 255-4700 - Telephone  
(713) 655-1597 - Facsimile

Attorney in Charge for Plaintiff  
Fisher Kanaris, P.C.  
200 S. Wacker Drive  
Floor  
Chicago, Illinois 60606  
(312) 474-1400 - Telephone  
(312) 474-1410 - Facsimile

Of Counsel for Plaintiff





**METALLURGICAL TECHNOLOGIES, Inc., P.A.**

*Engineering, Testing & Analysis - Scanning Electron Microscopy*

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**October 31, 2008**

Mr. Howard Lieber,  
FISHER KANARIS, PC  
200 South Wacker Dr., 22nd Floor  
Chicago, IL 60606  
(312)474-1415

**Re: Analysis of Unique Plastic Swivel Nuts and Brass Plumbing Fittings**

Dear Mr. Lieber,

Per your request, I am writing to summarize my experience with plastic swivel nuts and brass insert plumbing fittings distributed by Unique Industrial Product Company.

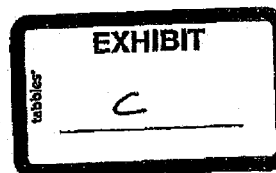
I am currently employed by Metallurgical Technologies, Inc. as a senior materials engineer in Mooresville, North Carolina. I have approximately 14 years of experience in fracture interpretation, root-cause failure analysis, investigative chemistry, and material analysis as indicated on the enclosed curriculum vitae. In December 1993, I graduated *magna cum laude* with a B.S.E. degree in Materials Science and Engineering from Arizona State University.

From July 2002 through October 2007, I was employed by Uponor North America (formerly Uponor Wirsbo) as Manager of Material Analysis. In that capacity, I was responsible for the creation and management of an analytical services laboratory dedicated to root cause failure analysis, investigative chemistry, and materials engineering support for Uponor North America. During my employment with Uponor, I personally evaluated numerous new and field-returned plastic swivel nuts and brass insert plumbing fittings supplied by various companies, including those distributed by Unique Industrial Product Company. Clusters of failures had occurred, over a relatively short time period, in swivel nuts and brass fittings provided by Unique. All of the failed brass fittings associated with this analysis were labeled "F1807", and all exhibited a "cNSF uspw" demarcation.

Summary of Conclusions:

After extensive evaluation of the new and failed components, it is my opinion that the swivel nuts and brass insert plumbing fittings failed due to manufacturing defects. More specifically, it is my opinion based on a reasonable degree of engineering certainty that:

1. The plastic swivel nuts fractured due to : a) low cycle fatigue initiating at areas of stress concentration in the threads and b) due to excessive gas



Analysis of Unique Plastic Swivel Nuts and Brass Plumbing Fittings  
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- porosity in the walls of the nuts. The gas porosity consumed a substantial portion of the wall thickness, effectively weakening the nut. This allowed fatigue cracks to initiate in the threaded region of the nut where they would not have otherwise initiated. The weakened parts were made even more vulnerable to fatigue crack initiation by stress concentrations in the threaded region resulting from non-uniform thread faces, undercutting in the thread roots, and sharp corners associated with a square thread root geometry. All of these product deficiencies (porosity, non-uniform thread faces, undercutting in the thread roots, and square thread root geometry) were indicative of a poorly controlled molding process and/or mold design.
2. Laboratory testing of new, unused swivel nuts from Generations I, II, and III revealed similar defects which created a significant probability that these components would fail prematurely if placed into service. Uponor could not have sold these components in good conscience knowing that they would not reasonably be expected to perform as intended. Uponor acted responsibly and with integrity by rejecting the defective swivel nuts.
  3. The brass insert fittings fractured due to stress corrosion cracking resulting from multiple factors including the combined effects of excessive residual stress in the brass material (attributed to forging and machining of the fittings without proper stress relief), coupled with an incompatible chemical introduced during the manufacturing process. Furthermore, testing performed by companies retained by both Uponor and Unique revealed that many of the fittings that fractured during service did not conform to the chemical requirements of ASTM F1807.
  4. Evidence of stress corrosion cracking was identified in new, unused fittings that were understood to have been manufactured during approximately the same time frame as the failed fittings. Many of these fittings, which were retrieved from plumbing distributor's shelves in Minnesota where a significant number of brass fitting failures had occurred, were still sealed in their original packaging from Unique Industrial Product Company when I received them for analysis.
  5. Laboratory testing of new, unused brass insert fittings revealed that a significant amount of Uponor's existing inventory of Unique brass insert fittings exhibited an alloy chemistry that did not conform to the requirements of ASTM F1807. For these fittings to be used with PEX tubing for potable water distribution, the fittings were required to conform to ASTM F1807. Thus, Uponor could not sell these components knowing that the alloy chemistry was not in compliance, particularly given that many of the fittings that failed during service also exhibited a non-conforming alloy chemistry. Uponor acted responsibly and with integrity by rejecting the non-conforming brass insert fittings.

Analysis of Unique Plastic Swivel Nuts and Brass Plumbing Fittings  
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6. Opinions expressed by Dr. Charles Hayes in a reported provided by Unique Industrial Product Company are inaccurate, ill-supported, and in direct contradiction to data presented in the Hayes' report.

**Evaluation of Plastic Swivel Nuts and Brass Insert Fittings**

Plastic Swivel Nuts

Detailed laboratory testing of field-returned plastic swivel adaptors revealed that the swivel nuts fractured due to a fatigue fracture mechanism resulting from manufacturing defects in the molded swivel nut. Specifically, the failures were attributed to excessive porosity and poorly molded threads, which significantly weakened the parts and provided stress concentrations that caused the cracks to fail by fatigue. In some cases, the porosity existed as clusters more than 0.5-inches long. The swivel adaptors were evaluated by visual inspection, stereo microscopy, metallography, radiography, Fourier transform infrared spectrometry, scanning electron microscopy, differential scanning calorimetry, and energy dispersive x-ray spectroscopy.

Radiography and metallography performed on multiple lots of new, unused swivel nuts (Generations I, II, and III) revealed porosity and/or poorly molded threads, similar to what was observed in previously evaluated field failures. Given that the new swivel nuts exhibited manufacturing defects that were virtually identical to defects that caused the field-returned product to fail, I concluded that the new swivel adaptors would be expected to also fail prematurely in a typical service environment, and that they should not be installed.

Multiple sets of "Generation II" and "Generation III" swivel nuts were evaluated in an effort to determine whether the manufacturing defects had been corrected and whether the nuts were suitable for their intended application. Laboratory testing revealed similar manufacturing defects (porosity and/or poorly molded threads) in each generation of new product evaluated. This indicated that the new production swivel nuts were also unsuitable for the intended application, and that they also would likely fail prematurely if placed into service.

Since the porosity and irregular thread geometries observed in these components resulted from poorly controlled manufacturing processes rather than from a material deficiency, it was not surprising that 1) similar defects were observed in both nylon and polyacetyl production swivel, and 2) the nylon Generation III production swivel nuts exhibited porosity that was *not* observed in a previously-evaluated set of five nylon prototype swivel nuts. Comparative analysis of similar nylon swivel nuts manufactured by Marshall Brass revealed little or no porosity and uniform thread geometries that were less conducive to fatigue crack initiation. This further indicated that the defects noted in the Unique swivel nuts resulted from poorly controlled manufacturing processes rather than from a material deficiency.

Analysis of Unique Plastic Swivel Nuts and Brass Plumbing Fittings  
Page 4 of 6

An engineering drawing representing the nylon swivel nut to be provided by Unique showed a fully intact wall with no indication that some level of discernible porosity would be allowed in the swivel nut. Further, the engineering drawing contained no detail regarding the thread root geometry, and it included no indication that undercutting or non-uniform thread faces would be allowed.

In my opinion, Unique Industrial Product Company did not exercise reasonable care to insure that the swivel nuts they distributed to Uponor were free of manufacturing defects. The gross porosity that weakened these swivel nuts and caused them to fail could have been detected by simply weighing production samples. No special equipment or expertise was required to detect these defects, as the porosity was often visible to the unaided eye if the swivel nuts were visually inspected under bright lighting.

Uponor could not sell the Generation II and III production swivel nuts, knowing that these components were unsuitable for the intended application, were not in compliance with industry standards, and that there was a significant probability that the nuts would fail prematurely during service. It was appropriate for Uponor to reject and quarantine the defective swivel nuts received from Unique.

Brass Plumbing Fittings:

Detailed laboratory testing of failed brass insert fittings revealed fracture features consistent with transgranular stress corrosion cracking initiating at the interior, machined surface of the fittings. These fractures resulted from multiple factors, including the combined effects of excessive residual stress in the brass material (attributed to forging and machining of the fittings without proper stress relief), coupled with an incompatible chemical environment and variable metallurgical composition. The failed brass fittings were evaluated by visual inspection, stereo microscopy, metallography, scanning electron microscopy, energy dispersive x-ray spectroscopy, and optical emissions spectrometry.

Unusually pronounced, atypical machining marks were noted at the interior surfaces of the brass fittings adjacent to the separation fractures. The brass material surrounding these machining marks exhibited evidence of heat tinting. Each fracture initiated at the interior surface of the machined outlet, and each fracture exhibited extensive oxidation and corrosion. Metallographic cross-sections through representative fractures revealed a predominantly transgranular fracture morphology, with some evidence of secondary crack branching. When viewed in cross-section, the fractures and crack branches were found to be outlined by corrosion product, indicating that corrosion played a key role in crack propagation. These fracture characteristics were indicative of a stress corrosion cracking fracture mechanism as discussed above.

Analysis of Unique Plastic Swivel Nuts and Brass Plumbing Fittings  
Page 5 of 6

Given the following facts:

1. Some brass fittings failed in a little as one to two weeks after installation in a typical potable water environment.
2. One brass fitting reportedly fractured during installation, before ever coming into contact with water.
3. Clusters of fitting failures occurred in multiple regions of the US (representing a variety of installers and a variety of water chemistries) within a narrowly defined time period, in an application where no significant failures had previously occurred.

It is my opinion to a reasonable degree of engineering certainty that the stress corrosion cracking experienced by these fittings occurred due to causes associated with the manufacturing process. New brass insert fittings retrieved from the shelves of distributors in Minnesota, where a significant number of brass fitting failures had occurred, were analyzed to determine if cracks were present. Metallographic cross-sections and scanning electron microscopy revealed small cracks at the interior machined surfaces of multiple new brass fittings that had never been installed. Many of these cracked fittings were still sealed in their original packaging from Unique Industrial Product Company when received for analysis.

Chemical analyses performed by Twin City Testing using optical emissions spectrometry revealed that a significant number of failed fittings, and a significant amount of Uponor's existing inventory of Unique brass insert fittings, exhibited an alloy chemistry that did not conform to the requirements of ASTM F1807. Chemical analyses performed by A and M Technical Services Laboratories, Inc. and SHIVA Laboratories at the request of Unique Industrial Product Company also revealed that the brass chemistry did not conform to the requirements of ASTM F1807.

The non-conforming alloy chemistry rendered Uponor's brass fitting inventory unsuitable for the intended application and was an exacerbating factor to the failure mode. Uponor could not sell these brass fittings knowing that the alloy chemistry was not in compliance with ASTM F1807 and that there was a significant probability that the brass fittings would fail prematurely during service. The brass fittings provided by Unique exhibited clear indication of inferior quality and were inconsistent with industry standards. Therefore, it was appropriate for Uponor to reject and quarantine the brass fittings received from Unique.

Analysis of Unique Plastic Swivel Nuts and Brass Plumbing Fittings  
Page 6 of 6

Documents Reviewed or Relied Upon for the Purpose of this Analysis:

- Various reports, supporting data, photos, and e-mail correspondence generated in association with this analysis during my employment at Uponor
- Swivel nut engineering drawing provided by Unique
- Chemical analysis reports produced by Twin City Testing
- Chemical analysis data produced by SHIVA Laboratories at the request of Unique Industrial Product Company
- Chemical analysis data produced by A and M Technical Services, Inc. at the request of Unique Industrial Product Company
- Radiographic test reports produced by Twin City Testing
- ASTM Standard F1807, "Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-Linked Polyethylene (PEX) Tubing."
- ASTM Specification B16 for machined copper alloy UNS C36000
- ASTM Specification B283 for forged brass alloys UNS C37700 or UNS C36500
- ASM International, ASM Specialty Handbook for Copper and Copper Alloys, Edited by J.R. Davis of Davis and Associates, © 2001.
- ASM International, ASM Metals Handbook, Volume 11, Failure Analysis and Prevention, 1986 and 2002,
- Jones, Denny A., Principals and Prevention of Corrosion, New York, Macmillan Publishing Company, 1992,
- Conlangelo, V. J. and Heiser, F. A., Analysis of Metallurgical Failures - Second Edition, New York, John Wiley & Sons, 1987,
- Dr. Charles Hayes, "Brass Fittings for Water Distribution", reported prepared for Unique Industrial Product Company, January 2007.

Prepared by:

*C. L. Smith*

Cynthia L. Smith  
Senior Materials Engineer



IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF TEXAS  
HOUSTON DIVISION

UPONOR, INC.,

Plaintiff/Counter-Defendant,

v.

CIVIL ACTION NO. H-07-2986

UNIQUE INDUSTRIAL PRODUCT  
COMPANY,

Defendant/Counter-Plaintiff.

AFFIDAVIT OF CYNTHIA L. SMITH

The undersigned, CYNTHIA L. SMITH, being first duly sworn on oath deposes and states that if called as a witness in this matter I would testify as follows:

1. I have personal knowledge regarding the matters set forth herein.
2. Since October, 2007 I have been employed with Metallurgical Technologies, Inc. (MTI) as a Senior Materials Engineer and Technical Manager. In that capacity, I perform and direct failure analysis, forensic chemistry, material testing and analysis, and corrosion investigations. Prior to working at MTI, from July 2002 through October 2007, I was employed by Uponor North America as Manager of Material Analysis. In that capacity I created and managed an analytical engineering services laboratory dedicated to material research and development, failure analysis and investigative chemistry. As Manager of Material Analysis I managed a team of six engineers and technicians responsible for process engineering, and I also managed the material analysis laboratory for Uponor which included services relating to failure analysis of metals and polymers, forensic chemistry, oxidation/degradation analysis of polymers, corrosion studies, and material specification/design support.





3. During the period of July 2002 through October 2007 while I was the Manager of Material Analysis for Udonor, I conducted hundreds of failure analyses and generated reports discussing failures of metal and plastic products, including obtaining chemical analysis relating to the failure of metal components. My work in analyzing/evaluating failed metallic and plastic components has included visual inspection, stereo microscopy, metallography, radiography, Fourier transform infrared spectrometry, scanning electron microscopy, differential scanning calorimetry, and energy dispersive x-ray spectroscopy. Additionally, during the course of my employment with Udonor, I routinely sent metal products to testing laboratories for quantitative chemical analysis performed by optical emissions spectrometry. Well over 100 chemical analyses were requested. During the period of 2001 through July 2002 I was Director of Failure Analysis and Investigative Chemistry at Stork Twin City Testing in St. Paul, Minnesota. In that capacity, I managed a team of five metallurgists and chemists providing engineering consulting in failure analysis, metallurgical engineering, investigative chemistry, polymer analysis, and corrosion investigations. During my employment at Twin City Testing, I routinely reviewed and approved chemical analysis reports for metal components, where the chemical composition of the metal was determined by Optical Emissions Spectrometry and/or by Inductively Coupled Plasma Spectrometry. A copy of my Curriculum Vitae is attached hereto as Exhibit "A".

4. Prior to working at Stork Twin City Testing, I was employed by AlliedSignal Engines as a materials engineer performing failure analysis (including metallurgical analyses) of turboprop and gas turbine engine components in support of design, warranty administration, materials and process engineering, and flight safety. I performed numerous investigations which were attended by FAA and NTSB representatives including analysis of failure mechanisms for metal components of aircraft engines. During my employment with AlliedSignal Engines, I

periodically requested that metal samples be analyzed for chemical composition determined by inductively coupled plasma spectrometry, and I was responsible for interpreting the resulting data for conformance to specification.

5. During the course of my employment with Uponor, I participated in meetings with representatives of Unique Industrial Product Company, including Jay Milani, Pradeep Gupta and Ketel Bhvkar in connection with failures of brass fittings and plastic swivel nuts. These meetings took place between August 2006 and January 2007, and included a meeting in January 2007 attended by representatives of Duk San, which was involved in the manufacture of both the brass fittings and plastic swivel nuts involved in this claim.

6. Based upon my personal interaction with representatives of Unique and representatives of Uponor, I became familiar with the design and specifications for both the brass F1807 fittings and the plastic swivel nuts.

7. I attended meetings with Unique's personnel and representatives of Duk San during which the parties discussed the specifications for the brass fittings and plastic swivel nuts, the source of the specification and design for those products as well as the testing and approval/rejection of those products. Unique's representatives supplied me with a design drawing for plastic swivel nuts which identified "Unique Industrial Product Company" as the designer of the swivel nut, and RFI as the "end user". A copy of that design drawing is attached hereto as Exhibit "2".

8. In various meetings with representatives of Unique from August 2006 through January 2007, Unique's representatives confirmed the brass fittings were distributed by Unique and never disputed that the swivel nuts had been distributed by Unique. Furthermore, at a meeting in January 2007, at which representatives of Duk San were presented, no issue was ever

raised as to whether the brass F1807 fittings and plastic swivel nuts had been manufactured by Duk San and distributed by Unique for Duk San.

9. A subsidiary of Uponor, Radiant Technology, Inc. ("RTI") initially purchased the fittings from Unique with the requirement that the fittings comply with ASTM Standard F1807. The applicable material standard referenced by F1807 is ASTM B283 which applies to copper and copper-alloy die forgings. The B283 Standard for chemical analysis, by its own terms, applies to finished product, not simply raw materials. For example B283 states that "one sample for chemical analysis shall be taken for each heat at the time of pouring or from semi finished or finished product". See ASTM B283, S3.3 a copy of which is attached hereto as Exhibit "3".

10. ASTM E478 is not the standard test method for chemical analysis, but rather is a referee test method that can be invoked if the parties so agree in order to obtain test data when other test standards have resulted in disagreement. See ASTM B283 Section 13.1.1 and 13.1.2. In this case the parties never agreed to use E478 for chemical analysis testing. The chemical testing undertaken by Unique prior to Uponor filing suit, was performed by A&M Technical Services and Shiva Laboratories, both of which used the same methods as Uponor and, as is typical in the industry, make no reference to ASTM standards, including Standard E478. A copy of the A&M Technical Services, Inc. chemical testing data is attached hereto as Exhibit "4".

11. Duk San's quality assurance data reflects that only one sample per lot of brass fittings was subjected to chemical analysis.

12. I examined and analyzed new brass fittings which were never installed. These fittings, "out of the bag" showed evidence of micro-cracking. In light of these findings regarding new fittings that were never installed, I concluded that faulty installation was not a cause of failure in the brass fittings supplied by Unique.

13. My conclusion that faulty installation was not a cause of failure in the brass fittings supplied by Unique was further supported by the history of fitting failures. A sudden rash of failures occurred in multiple states (where varying water chemistry conditions existed) during a narrowly defined time period, involving various plumbing contractors who had previous experience successfully installing these components. This fact also undermines any question of installation error.

14. There was no reason to investigate the specific design of the brass fittings, as that design has been successfully used in the plumbing industry for a number of years without incident.

15. Uponor was able to identify the brass fittings that were failing as having been supplied by Unique based upon the distinctive "US-PW" marking on those fittings. No company other than Unique had supplied fittings to Uponor with the "US-PW" marking and the failed fittings that were being returned by plumbers, wholesalers and developers exhibited the distinctive "US-PW" marking.

16. The F1807 brass fittings are not threaded and cannot be "over-tightened" during the course of installation.

17. With respect to plastic swivel nuts, an installation error is not plausible as a failure mechanism where the swivel nuts contain substantial voids/pores in the walls of the plastic nuts or a square thread root, as both of these phenomena relate to the manufacture of the plastic nut.

18. There is no reliable "test" to determine the "relative importance" of the porosity and design issues with the swivel nuts involved in this case. I assessed the relative importance of porosity and design/molding deficiencies in swivel nuts by examining the fractures and

observing that the initiation point for the fractures was associated with stress concentrations in the thread routes, and the fact voids/pores in the molded walls of the plastic nuts were bisected within the plane of fracture.

19. The presence of the voids/pores in the plastic nuts substantially diminished the structural integrity of the swivel nut walls, thereby significantly increasing the probability of failure, even without the presence of the improper thread root geometry. In some cases the voids/pores consumed 50% of the wall thickness of the plastic nuts.

**FURTHER AFFIANT SAYETH NOT.**

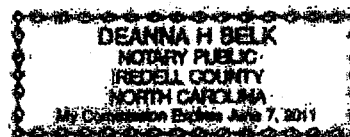
*Cynthia L. Smith*  
CYNTHIA L. SMITH

Subscribed and Sworn to before  
me this 30 day of March, 2009.

*Deanna H. Belk*  
NOTARY PUBLIC

My Commission Expires:

6/7/2011





THOMAS W. EAGAR, Sc.D., P.E.  
ROOM 4-136  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
CAMBRIDGE, MA 02139-4307  
617-253-3229  
FAX 617-252-1773

October 28, 2008

Fisher Kanaris  
200 South Wacker Drive  
33<sup>rd</sup> Floor  
Chicago, Illinois 60606

Attention: Howard Lieber

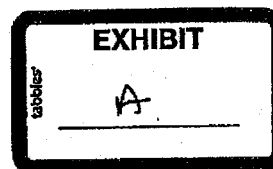
RE: Uponor Brass Fittings for PEX Tubing

Dear Mr. Lieber,

At your request, I have investigated a number of field failures of brass fittings distributed by Uponor. The list of samples which I inspected are given in Appendix A. It was reported that there have been over sixty failures of fittings over less than a year and that additional field failures were reported thereafter.

My investigation has included the following:

1. Visual inspection of both field failures and exemplar fittings using a stereomicroscope. Selected samples were also examined in the Scanning Electron Microscope.
2. Chemical analysis of 13 exemplar fittings as listed in Appendix B.
3. Review of ASTM F1807, B16 and B283.
4. Bend and fracture tests on selected exemplars.
5. Metallography and microhardness of both selected field failures and exemplar fittings.
6. Microfocus x-rays of exemplar fittings.



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October 28, 2008  
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7. Depositions of: William Marshall, July 8, 2008  
William Marshall, July 9, 2008  
Jugal Malani, July 9, 2008
8. Uponor – Summary of Abbreviated Investigation, July 13, 2006, RMA: 717447
9. Uponor – Summary of Investigation – Unique Brass Fittings  
– Undated Bates Numbers UI08452 to 08472
10. NSF/ANSI Standard 14 – Bates UI08070 to 08079
11. Uponor Notice of Revision – UI02098 to UI02102
12. Emails: a) From Mark Dubaneski to Anders Tollsten,  
January 11, 2007  
b) from Loc Hoang to John Liebelt, 12/01/2006
13. Documents: UI08062 to UI08069  
UI08434 to UI08451  
UI08474 to UI08495  
UI00689 to 00693  
UI00944  
UI00714  
UI00899-00900  
UI01261 to 01263  
Deposition Exhibits 45 – 51  
Deposition Exhibits 30 – 36  
UI01016 to 01018
14. Documents: Unique/Uponor 000095 to 000168

Based upon this investigation, I have made the following observations and I have formed the following opinions based upon a reasonable degree of engineering certainty.

1. Each of the field failures fractured due to stress corrosion cracking. These cracks were initiated by cracks on the inside wall of the fittings. This inside wall is a machined (drilled) surface; however, the machined surfaces of both fractured and new exemplar fittings showed severe smearing and surface cracking. Such smearing and surface cracking can be produced by a number of factors, including *inter alia* dull tools, excessive tool feeds and speeds, and improper alloy composition or microstructure.



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2. The fittings made from wrought material were specified as C36000 brass alloy. The forged fittings (elbows, tees and the like) were specified as C37700 alloy. The chemical analyses (performed by Inductively Coupled Plasma Spectroscopy except for the oxygen content) show that the lead analysis of the C37700 alloy was consistently outside the ASTM B283 specification range. Some of the iron analyses were above the B283 maximum value. Some of the C36000 alloy samples also failed to meet the chemical requirements for iron content.
3. The bend tests showed significantly different behavior between the C36000 couplings and the C37700 forgings. The couplings, which were presumably machined from bar stock could sustain a 2T bend of 180°. The C37700 forgings fractured with low ductility at a considerably smaller angle and a larger bend radius. Observation of the fracture surface of the C36000 alloy in the Scanning Electron Microscope, revealed ductile dimples. The C37700 fractures exhibited little evidence of ductile dimpling.
4. Microhardness tests across the thickness of an exemplar sample LL-1 indicated a Vicker's hardness on both machined surfaces of 145 to 152 with a core hardness of 115. This higher surface hardness is consistent with the smearing and cracking observed on the machined surfaces. Such smearing and higher hardness will create surface residual stresses on the fitting.
5. Observation of the lead particle size distribution using both the microfocus x-ray and metallography, showed a 20 to 100 micron lead particle size in the C36000 alloy as expected for free machining brasses. The C37700 forgings had no larger lead particles; the entire lead distribution was a fine dispersion of 1 to 3 micron particles. Such a fine dispersion of second phase particles results in a substantial loss of ductility [see W.A. Backofen, *Deformation Processing*, Addison Wesley, 1972, p.247].
6. The fine dispersion of lead particles can be explained by reference to the copper-zinc-lead ternary phase diagram [see, Handbook of Ternary Alloy Phase Diagrams, Volume 8, ASM International, 1995, p.9937]. As these brasses are heated to temperatures above 700°C, the lead will dissolve in the brass. If the alloy cools too quickly, the lead will re-precipitate as a fine dispersion.

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7. Mr. Marshall indicated that the brass fittings would fail the dimensional checks 1 to 2 percent of the time [Marshall deposition, 8 July 2008, p.44]. Uponor's internal testing also reflected failure of dimensional checks [see the email referred to in 12(b) above]. These dimensional discrepancies, plus the failure to meet the chemical specifications (see paragraph 2 above as well as testing performed by Stork Labs) indicates that a substantial number of these fittings did not meet the ASTM F1807 specifications.
8. Mr. Malani indicated that the Korean manufacturer used a lead leaching process to remove lead from the surface [Malani deposition, p.22]. Such leaching of the lead would produce notches in the surface. These notches, combined with the surface residual stresses, will contribute significantly to the formation of stress corrosion cracking both prior to service and during service of these fittings.
9. Although Dr. Hays' report indicates that the failures occurred due to fatigue, I see no evidence of fatigue failure on the fracture surface of the brass fittings. In addition, estimation of the cyclic stresses due to "the pulsating flow of the water throughput," indicates levels of less than 100 psi. These cyclic stresses are too low to cause fatigue in brass alloys such as these fittings. Thus, failure due to fatigue is highly improbable.
10. Dr. Hays' report indicates that the neutral axis of the fitting is the mid-thickness of the tube wall. This is incorrect. For a tube, the neutral axis is at the axial center of the tube. Use of the neutral axis as selected by Dr. Hays will result in huge errors in the calculated bending stresses.
11. The failures of these fittings are related to manufacturing deficiencies (rough machining, compositional variations, dimensional deviations, aggressive leaching) and are not due to deficiencies in design of the fittings. Detection of such manufacturing defects is the responsibility of both the manufacturer and the distributor (Unique). The manufacturer is responsible for quality control continuously throughout the manufacturing process. The distributor or reseller (Unique) is responsible for quality assurance. Such quality assurance requires periodic quality audits of the manufacturing facility as well as random testing of samples of the received products to ensure that the specifications are being met. Unique acknowledges that such quality assurance procedures were not in place and incoming material was merely trans-shipped to Uponor.

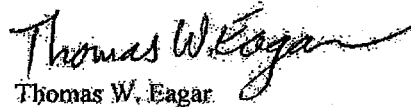
Howard Lieber  
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The distinction between design and manufacturing applies to the approval of NSF as well. NSF approves designs and materials, but NSF does not certify or audit the manufacturing process to ensure that a consistent product quality is being produced. Stated simply, NSF approval certifies the design but does not provide manufacturing quality control or even quality assurance. NSF approval indicates that the design meets a particular specification.

Based upon the foregoing, I have concluded to a reasonable degree of engineering certainty that these failures occurred due to stress corrosion cracking (SCC). The cause of the SCC was multi-dimensional including the high surface residual stresses and pre-cracking. These high residual stresses and pre-cracks were due to improper machining and lead leaching of the fittings. Many of the fittings did not conform to ASTM F1807, as required. The failure of the fittings to comply with F1807 also played a role in the process leading to SCC. Thus, these failures result from manufacturing defects in the fittings.

Based upon this investigation, it is my opinion that it was appropriate for Uponor to reject fittings which did not conform to the ASTM F1807 specification in terms of chemical composition and dimensions. Any seller of fittings represented to conform to the ASTM specification, which seller knew that the fittings did not conform, would be making a serious misrepresentation of the product. In addition, the smeared metal due to improper machining meant that these fittings were not of the standard of quality expected of parts manufactured from free cutting brass. Free cutting brass should produce one of the cleanest and smoothest and least deformed machined surfaces.

Sincerely yours,

  
Thomas W. Eagar

jh

## APPENDIX A

## 1. New fittings rejected by Uponor for non-conforming chemistry (52 fittings total):

a.	P4516375-P119	(2 fittings)
b.	P4515050-T1	(2 fittings)
c.	P4845050-T1	(2 fittings)
d.	P4175050-T1	(2 outs)
e.	P4525050-T1	(2 fittings)
f.	P4376375-P119	(2 fittings)
g.	P4503850-P119	(2 fittings)
h.	P4175050-P119	(2 fittings)
i.	P4705050-P119	(2 fittings)
j.	P4506375-T3	(2 fittings)
k.	P4703838-T3	(2 fittings)
l.	P4545050-P119	(2 fittings)
m.	AA-1-Loose/P4707555	(2 fittings)
n.	CC-1-Loose/P4710500	(2 fittings)
o.	EE-Loose/P4710500	(5 fittings)
p.	EE-1-P4710500	(5 fittings)
q.	JJ-1/P4705050	(5 fittings)
r.	KK-4/P4705050	(5 fittings)
s.	MM-1/P4705050	(1 fitting)
t.	NN-3-Loose/P4707555	(3 fittings)

## 2. Field-returned fitting that Uponor destructively evaluated:

a. MA00507

## 3. Field-returned fractured fittings in the as-received condition:

a. MA00492  
b. MA00523  
c. MA00539

## 4. New fittings (never installed) returned from distributors who have had fittings crack in the field:

a. LL-Loose (5 fittings)  
b. LL-1 (5 fittings)  
c. JJ-1 (5 fittings)

5. Field-returned fittings received March 16:

- a. MA00506
- b. MA00493

6. 25 - P4710500 elbows from Ryan Homes

7. Received March 22:

- a. LL-1 (5 fittings)

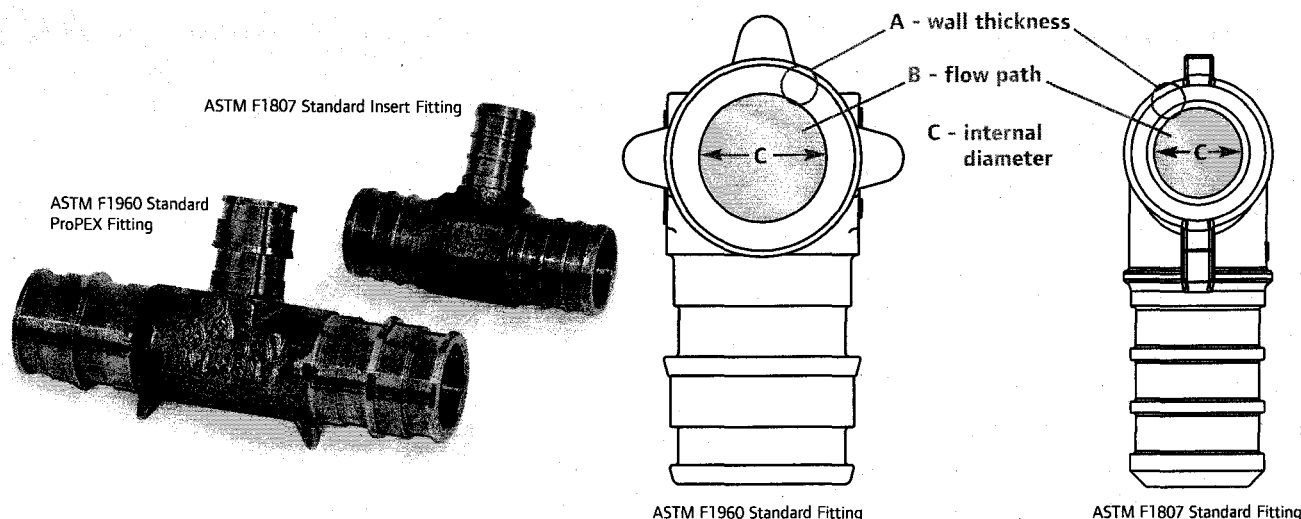


# Uponor

PLUMBING SYSTEMS  
FITTING SYSTEMS

FACT SHEET

## How does the Brass ASTM F1960 Standard Uponor ProPEX® Fitting System compare with ASTM F1807 Standard Insert Fittings?



ASTM F1960 Standard Uponor ProPEX® Fitting System		ASTM F1807 Standard Insert Fittings		Uponor ProPEX Advantages	
A	Thicker wall results in lower overall stress for superior performance in all water environments	1/2" fitting = 0.057" wall thickness 1" fitting = 0.072" wall thickness	Thinner wall offers less resistance to stress and corrosion	1/2" fitting = 0.028" wall thickness 1" fitting = 0.041" wall thickness	1/2" fitting features 103% greater wall thickness 1" fitting features 75% greater wall thickness
	Larger cross-sectional area provides better flow	1/2" fitting = 0.112 sq. inches 2.9 gpm at 8 ft./sec. 1" fitting = 0.496 sq. inches 12.4 gpm at 8 ft./sec.	Smaller cross-sectional area restricts flow	1/2" fitting = 0.096 sq. inches 2.4 gpm at 8 ft./sec. 1" fitting = 0.396 sq. inches 9.9 gpm at 8 ft./sec.	1/2" fitting offers 20% higher gpm 1" fitting offers 25% higher gpm
C	Greater minimum internal diameter (i.d.)	1/2" fitting = 0.378" 1" fitting = 0.795"	Smaller minimum i.d.	1/2" fitting = 0.350" 1" fitting = 0.710"	1/2" fitting has 8% larger minimum i.d. 1" fitting has 12% larger minimum i.d.
	Large offering of engineered plastic (EP) fittings available		Limited offering of plastic fittings available		Plastic fittings more resistant to aggressive water environments compared with metal fittings
Works with the shape-memory properties of Uponor PEX-a tubing		Does not take advantage of the properties of PEX-a tubing		Provides a stronger, more reliable connection	
Go/no-go gauges are never required		Requires testing every copper crimp fitting connection with a go/no-go gauge		Saves valuable installation time	
Cannot be dry fit — never a question if the connection is made		Can be dry fit — could result in uncrimped connections		Never have to second-guess whether a connection is complete	

Uponor, Inc.  
5925 148th Street West  
Apple Valley, MN 55124 USA

Tel: (800) 321-4739  
Fax: (952) 891-1409  
Web: [www.uponor-usa.com](http://www.uponor-usa.com)

Exhibit E  
Page 1 of 1



P.O. Box 240384 • St. Paul, MN 55124 • 888.311.9582 • Fax 877.899.9589

[www.rtiplumbing.com](http://www.rtiplumbing.com)

October 14, 2008

**VIA U.S. MAIL**

[Name] or Current Owner  
[Street Address]  
[City, ST, Zip]

**Re: IMPORTANT INFORMATION REGARDING YOUR PLUMBING  
SYSTEM PLUMBING REMEDIATION PROGRAM**

Dear [Name] or Current Owner:

We recently discovered that the plumbing of several homes in your neighborhood is susceptible to premature deterioration that may result in leaks around connections in the piping. The plumbing system at issue is the RTI Plumb-PEX Oetiker Clamp system. As we investigated these issues, we determined that other homes in the Las Vegas area with similar plumbing systems could be at risk for leaks in the future. Our records indicate that this plumbing system may have been installed in your home.

This letter is provided to inform you of the risk that the plumbing system in your home may be susceptible to future leaks, as well as to convey our offer to perform repairs to your plumbing system at no cost to you.

We have discussed this matter with your homebuilder, D.R. Horton, and D.R. Horton fully supports RTI's efforts to remedy this situation for the benefit of its customers. D.R. Horton is involved and working with us on this offer and in our remediation program.

We want you to know that RTI stands behind its products, and an important goal to us is to minimize your inconvenience as we complete these repairs. For this reason, we have selected an experienced repiping specialist to perform the repairs in your home. We have great confidence in this contractor in that they have completed several thousand "repiping" repairs for homeowners in several states, and the company has a long record of customer satisfaction. The contractor offers a comprehensive, stream-lined protocol for repiping your home. For most homes, the entire repiping procedure, including drywall, texture and paint repairs, takes approximately one week. In most cases, water will be turned off for a total of only 8 to 10 hours. This minimizes interruptions to your daily schedule. The contractor is also committed to keeping your home clean throughout the process—about one-third of the job schedule is dedicated to this objective.



October 14, 2008

Page 2

When the work is complete, your new plumbing system will carry a new 25 year warranty that is fully transferable to future owners.

We invite you to contact us either to obtain further information regarding the plumbing remediation program or to set up an appointment to begin the repipe of your home. You may contact us through any of the following methods: (1) fax the enclosed Homeowner Request Form to 1-877-899-9589, (2) mail the enclosed Homeowner Request Form to: RTI Plumbing Systems, P.O. Box 240384, St. Paul, MN 55124; (3) send an email to RTI at [info@rtiplumbing.com](mailto:info@rtiplumbing.com), or (4) call our toll free number at 1-888-311-9582.

Please include in any communication to us your name, address, telephone number, and whether you:

- (1) want additional information regarding the repair process, or
- (2) want to set up an appointment to begin the repipe of your home.

We will contact you within 21 days either to provide you with the information you requested, or to schedule a time for the repiping specialist to walk through your home with you to determine if you have a RTI Plumb-PEX Oetiker Clamp system and schedule an appointment for the repairs if necessary.

If you experience plumbing leaks that require immediate attention, please contact RTI directly at 1-888-311-9582 for information on who to contact to inspect and repair your home. Your home will be inspected promptly and repairs completed at the earliest possible date, usually five days or less from the time of inspection.

RTI sincerely appreciates your future cooperation and patience while we work to remedy this situation.

Sincerely,

*RTI Plumbing Systems*

**RTI Plumbing Systems  
Plumbing Remediation Program  
Homeowner Request Form**

- ☐ Yes, I would like further information regarding the plumbing remediation program. At this time, I am unsure whether I am interested in having repairs performed to my home.
- ☐ Yes, please contact me to set up an appointment to begin the repipe of my home
- ☐ No, I am not interested in having repairs performed to my home

Name (printed): \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

# PLUMB-PEX®

## plumbing systems

## Design and Installation

Effective - April, 2003

The Plumb-Pex® System .....	2
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# RTI

PEX PIPING SYSTEMS



# The Plumb-Pex® System

## Plumb-Pex® System Assembly Components

The Plumb-Pex® System consists of Plumb-Pex® Tubing, fittings and additional components supplied by RTI. Plumb-Pex® is a premium product with high temperature, pressure, and chemical resistance.

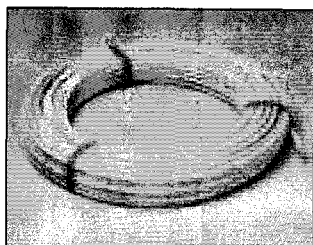
### Applications

Uses for Plumb-Pex® include:

- \* Potable hot and cold water distribution
- \* Water service
- \* Snow/Ice melt systems
- \* Turf conditioning systems

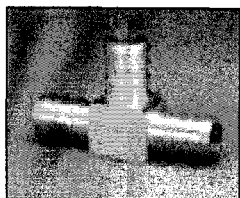
### Plumb-Pex® Tubing

Plumb-Pex® Tubing is cross-linked polyethylene. The tubing is numerically marked for easy measuring, and either boxed or bagged for added protection, and easy storage. Plumb-Pex® tubing is available in both coils and straight lengths. For easy hot and cold identification Plumb-Pex® is available in red and blue in addition to standard Plumb-Pex®.



### Plumb-Pex® Fittings

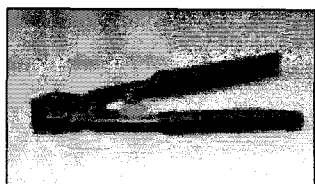
Plumb-Pex® fittings are manufactured of solid brass to ASTM F-1807 'Metal Insert Fittings' specifications. Fittings are NSF listed under Standards 14 and 61. The Plumb-Pex® assembly compresses the tubing onto the insert of the fitting producing a watertight seal.



### Plumb-Pex®

#### Assembly Tool

One tool assembles all sizes 3/8" through 1". The Plumb-Pex® tool's ratchet design releases only when proper assembly is completed.



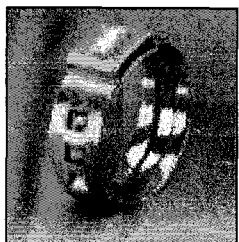
### Plumb-Pex® Manifolds

Plumb-Pex® Manifolds provide for the distribution of potable hot and cold water. Manifolds are available in copper, brass (Mini-Mans) and plastic (Plumb-Port) and can service either individual or groups of fixtures depending upon system design.



### Plumb-Pex® Clamp

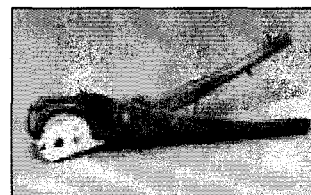
The patented Plumb-Pex® Clamp is manufactured of #304 annealed Stainless Steel to ASTM F2098. The clamp is an interlocking ring that forms a complete 360° uniform watertight seal which is constantly maintained by the clamp's unique spring action. No gauge is required to check the completed clamp



assembly. For easy hot and cold line identification, Plumb-Pex® Clamps are also available in red and blue.

### Plumb-Pex® Cutting Tool

A cutting tool is available for cutting of Plumb-Pex® tubing. A straight burr free cut is provided to ensure proper fitting assembly.



## Plumb-Pex® Standards, Ratings and Certifications

- \* Plumb-Pex® Tubing is manufactured to ASTM F876/F877 SDR9
- \* Plumb-Pex® Tubing carries the following pressure/temperature ratings:

160 psi	at	73.4° F	<i>These pressure/temperature ratings are issued by the Hydrostatic Stress Board of PPI (Plastic Pipe Institute).</i>
100 psi	at	180° F	
80 psi	at	200° F	

- \* Plumb-Pex® fittings are manufactured to ASTM F877/F1807/F2098

\* Plumb-Pex® Clamps are manufactured to ASTM F877/F2098

\* Plumb-Pex® system components are listed under NSF (National Sanitation Foundation) International Standard 14 that defines requirements for ingredients, materials, products, quality assurance, marking, and performance criteria.

\* Plumb-Pex® system components are listed under NSF Standard 61 that defines requirements for toxicity.

## Standard Dimensions and Lengths

Plumb-Pex® Tubing is available in the following coil sizes:

Pipe Size (I.D.)	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"
Actual O.D.		.500	.625	.875	1.125	
Actual I.D.		.360	.475	.584	.875	
Coil Sizes	100'	100'	100'	100'	100'	100'
		500'	300'	500'	300'	
			1000'		500'	
Straight Lengths			20'	20'	20'	

## Plumb-Pex® Warranty

The following Warranty coverage's are provided (please contact RTI or your local Plumb-Pex® distributor for the complete text of the warranty and conditions):

Plumb-Pex® Tubing	25 Years
Plumb-Pex® Fittings/Clamps	10 Years
Plumb-Port® Manifold	10 Years
Plumb-Pex® Tool	1 Year
Valves & Accessories	1 Year

**Exhibit G**  
**Page 2 of 12**

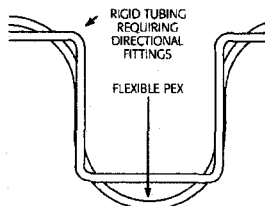
# Working With Plumb-Pex®

Plumb-Pex® is flexible and installer friendly. The following information will help to simplify and aid in the installation of Plumb-Pex®.

## Bending Plumb-Pex®

Bends less than 10" in diameter should be made slowly and carefully to avoid over-bending. Bend supports are available and may be used to provide additional support when a 90° bend is required.

The chart below illustrates the minimum bending radius for each size of Plumb-Pex® Tubing.



Minimum Bend Radius		
3/8" Plumb-Pex®		3"
1/2" Plumb-Pex®		3.75"
3/4" Plumb-Pex®		5.25"
1" Plumb-Pex®		6.75"
1-1/4" Plumb-Pex®		8.25"

## Cutting Plumb-Pex®

It is important that the cut be straight and perpendicular to the tubing. Cutting the tubing on an angle may result in an improper fitting assembly.

## Uncoiling

Plumb-Pex® Tubing is available in coils and straight lengths. Coiled tubing can be easily straightened due to the unique thermal memory of Plumb-Pex®. Simply cut the length of desired tubing and straighten by hand. A tubing uncoiler is also available if desired.

## Re-forming "Kinked" Plumb-Pex®

Plumb-Pex® can be described as a "plastic with memory." In the event that it is kinked, repairs can be made in the following manner:

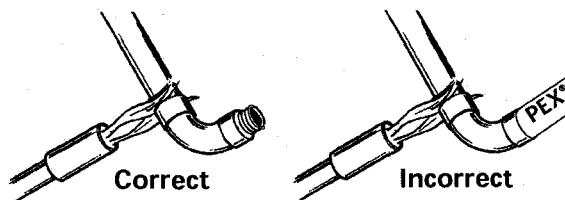
- 1.a) Straighten the kinked portion by hand. Do not attempt to work the tubing manually to repair the kink.
- b) Using an electric heat gun, heat the kinked area to approximately 265° F. Apply the heat evenly around the circumference of the tubing. Do not place the heat source directly onto the tubing.
- c) Let the re-formed tubing cool undisturbed to room temperature before continuing.
2. Cut out kinked section and reconnect cut ends with a Plumb-Pex® coupling.

## Hot Water Recirculating Systems

Plumb-Pex® Tubing can be safely used for hot water recirculating systems. Maximum temperature should be no greater than 140 degrees F. at 120 psi max.

## Limitations

**Soldering** - Soldering of Plumb-Pex® transition fittings (copper x Pex) must be done first, prior to assembling the fitting to Plumb-Pex®



Tubing. In the event that a solder joint must be made in the vicinity (within 18") of a previously installed Plumb-Pex® assembly, care should be taken to provide a suitable heat sink between the solder joint and Plumb-Pex® assembly. The Plumb-Pex® assembly should not be allowed to exceed 210°F.

**UV Exposure** - Plumb-Pex® should not be stored outside or used in any applications which are subjected to long term exposure to direct sunlight. Exposure to diffused sunlight during normal installation is not a problem.

**Installation restrictions** - Do not place tubing within 6 inches of flue vents or within 12 inches of recessed lighting fixtures. Do not install tubing where it may come into contact with fuels, oil products, solvents or chemicals. Contact RTI with MSDS information if there is a concern.

**Codes** - Check local code jurisdiction requirements prior to installing Plumb-Pex®.

**Ratings** - Do not exceed temperature and pressure ratings of tubing.

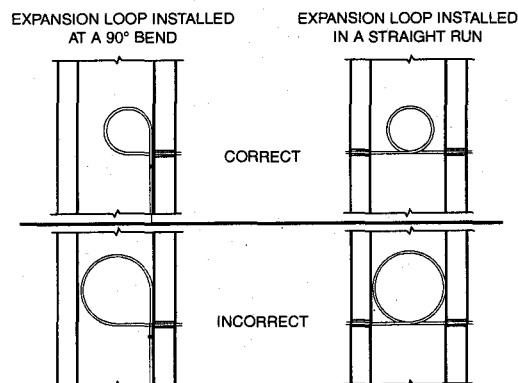
## Pipe Supports and Linear Expansion

**Only use plastic tubing ties and supports when securing Plumb-Pex® Tubing** to a structure, studs, or under slab.

- \* The linear expansion rate for Plumb-Pex® is approximately 1.1" per 10 degree Fahrenheit change for every 100 feet of tubing.
- \* When installing runs of tubing, allow 1/8" of longitudinal clearance per foot of run to accommodate thermal expansion. Tubing should be allowed to dip between supports. Do not pull tubing tight during installation.
- \* Plumb-Pex® should be allowed freedom of movement to expand and contract.
- \* Allow adequate clearance between the tubing and the structure (bored holes or sleeves) to allow freedom of movement.

## Expansion Loops

Linear expansion of tubing may also be countered by installing an expansion loop in the tubing run. This provides an area for the tubing to expand without causing stress. As the water warms and the tubing expands, the loop grows. As the water cools and the tubing contracts, the loop shrinks. (see diagram below)

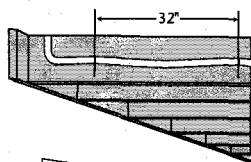


NOTE: Be sure to allow adequate space for the loop to grow.

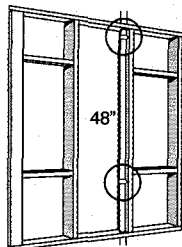
## Pipe Support Spacing

Plumb-Pex® must be anchored securely enough to support the tubing, yet relaxed enough to allow the tubing to expand and contract.

- 1) Along horizontal runs, install supports every 32" or less.

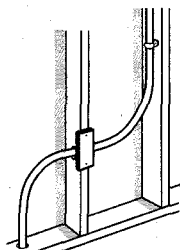


- 2) Along vertical runs, install supports every 48", at each floor, and as a mid-story guide.



## Wood Stud Installation

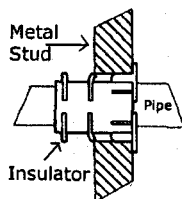
When Plumb-Pex® is installed through wood studs striker plates should be installed to protect tubing during construction and drywall installation (see illustration). Plumb-Pex® does not require sleeving when installed in wood studs if adequate clearance is provided. Should concern exist regarding chaffing or movement steel stud installation practices may be utilized.



## Steel Stud Installation

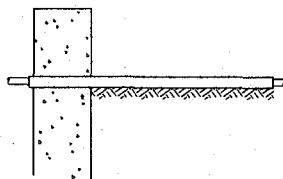
When passing Plumb-Pex® Tubing through steel studs use one of the following methods.

- 1) Use an approved insulator.
- 2) Pass the tubing through a section of plastic or poly pipe.



## Penetrating Foundation Walls

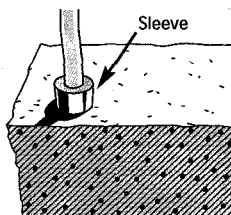
It is recommended when entering or exiting a foundation that a rigid piping material be used to protect the tubing from being pinched or chaffed during expansion and contraction of the foundation material.



## Installing Plumb-Pex® in a Slab/Underground Construction

- 1) Secure the tubing to wire mesh or rebar using Plumb-Pex® plastic ties at the intervals necessary to keep the tubing from floating up during the pour.

2) When Plumb-Pex® enters or exits a slab the tubing should be sleeved to provide protection. Pipe insulations rigid plastic conduit or Plumb-Pex® plastic elbows sleeves may be used. If Plumb-Pex® 90° metal bend supports are utilized at a slab penetration these also should be sleeved.



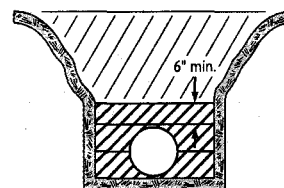
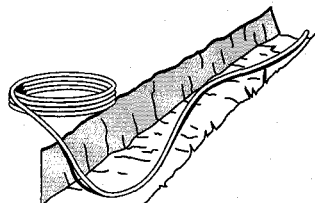
- 3) If the tubing must be run through an expansion joint, it must be sleeved or dipped below the joint and sleeved.

- 4) It is recommended that fittings not be buried directly in the slab or underground. A single continuous run of tubing should be used from entry to exit.

- 5) Maintain pressure either by filling the tubing with water or air during all phases of the pour.

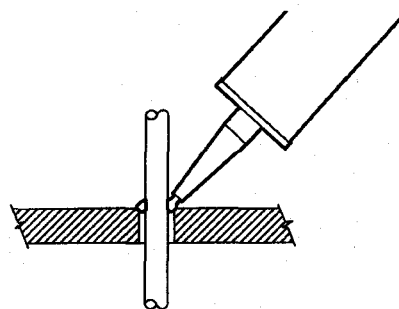
When placing Plumb-Pex® Tubing in a trench be sure that:

- 1) The bottom of the trench is clear of all debris including rocks and gravel that may come in contact with the tubing.
- 2) The trench bottom should be compacted providing a smooth even surface.
- 3) Place tubing in a loose manner to allow for contraction and expansion. (see illustrations below)
- 4) First fill should be clean fill free of debris, first fill should be minimum of 6 inches above the tubing prior to final back fill.
- 5) If tubing is to be buried in a location where future excavation may occur, it is prudent to protect tubing by first installing a rigid protective pipe and pass the tubing through it for added protection.



## Sealing Tubing Penetrations.

Penetrations may be sealed to eliminate air infiltration by applying a high grade silicone caulk or siliconized acrylic caulk (Never use oil based caulking).



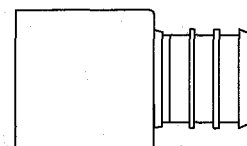
## Tubing Runs

- 1) Leave extra tubing at the beginning and end of runs to simplify the connection to manifolds and fittings.
- 2) Identify both hot and cold water lines by either taking advantage of our 1/2" and 3/4" color coded CLAMPS (red & blue) or use a permanent marker to identify each service line.
- 3) Runs should be direct as possible between the manifold and the fixtures it supplies.
- 4) Insulate hot water tubing runs where the code requires, or as necessary.

## When Using Sweat Fittings

When the use of Plumb-Pex® sweat fittings are required follow these instructions.

First solder or sweat the fitting onto the metal pipe using proper plumbing practices. After joining fitting to metal tubing allow sufficient time for the joint to cool to room temperature. After joint has cooled, Plumb-Pex® PEX Tubing can be joined to the fitting.

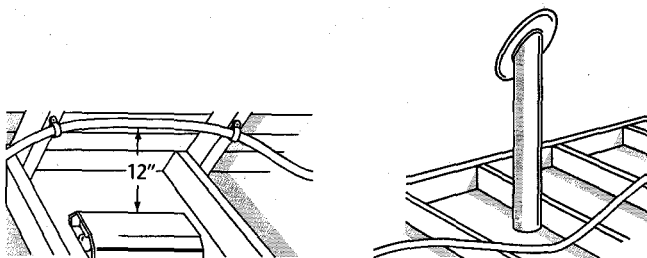


**Sweat Fitting**

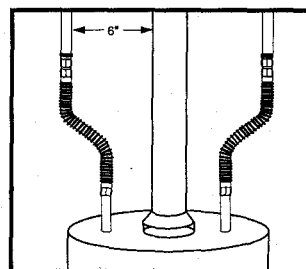


## Lighting and Vent Restrictions

Clearance should be provided when Plumb-Pex® is installed near a recessed light fixture, flue vent, heating appliances, or any electric apparatus. All tubing that comes in the immediate area of these examples should have a minimum distance of 12 inches of vertical clearance and 6 inches horizontal clearance from the light or vent.



## Connecting To Water Heaters



NOTE: Plumb-Pex® should not be connected within 6" of the vent on a water heater and not within the first 18" of piping connected to a water heater.

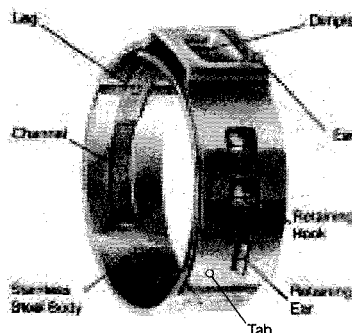
## Plumb-Pex® Installation

\*RTI offers a wide range of plumbing fittings and accessories for use with Plumb-Pex® Tubing (please refer to the Plumb-Pex® Product Catalog for a complete listing of products).

### Assembly

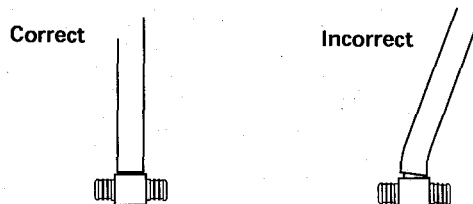
The Plumb-Pex® fitting system utilizes our patented stainless steel "stepless" clamp to secure Plumb-Pex® Tubing to Plumb-Pex® insert fittings. The clamps provide a 360 degree uniform seal which is constantly maintained by the unique spring action of the clamp's ear. The elastic memory of Plumb-Pex® Tube also engages the clamp's spring action, resulting in an ever-tightening leakfree connection. The Plumb-Pex® connection withstands extreme water pressure, temperature changes, and multiple freeze cycles. All sizes of Plumb-Pex® Clamps are assembled with the Plumb-Pex® Ratchet Tool.

### Plumb-Pex® Stainless Steel Clamp

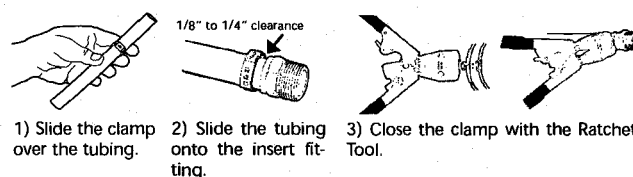


### Assembly of Connection

Cut the Plumb-Pex® Tube so that a clean, straight end is provided. Slide the Plumb-Pex® Clamp over the tube end. Insert a Plumb-Pex® fitting into the tube end making sure that the tube is fully seated over the insert barb. Care must be taken to assure that the tubing is positioned straight as it approaches the fitting with sufficient slack or support so that it is not being pulled or stretched to reach the fitting.



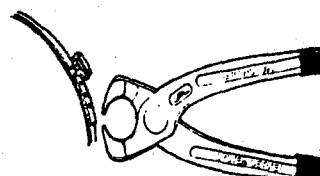
The Clamp should now be positioned so that it is 1/8" to 1/4" from the tubing's cut end. Place the opened jaws of the Plumb-Pex® Ratchet Tool over the raised ear of the clamp. Check to be sure that the clamp is still properly positioned then, with the tool held perpendicular to the tubing, begin to compress the tool handles. Continue until a first "click" is felt. The tool ratchet is now engaged and the clamp is locked onto the tubing. The tool handles can now be compressed together to complete the assembly.



**Note:** The Ratchet Tool will not release until the assembly is completed.

### Removal of a Completed Connection

If required, Plumb-Pex® Clamps may be removed as follows:



Using a Plumb-Pex® Clamp Removal Pincer, grab the edge of the clamp Tab and Retaining Ear (see Clamp description on left) with the pincer jaws. Rotate the pincer, pulling the Tab up and away from the Retaining Ear. The clamp will disengage from the Retaining Ear and be able to be easily removed.

**Note:** After removal of a clamp, the previously clamped section of Plumb-Pex® Tube should be cut off prior to assembly of a new connection.

### System Sizing

The sizing of the potable water distribution system must be in accordance with good engineering practice. See applicable codes for minimum pipe size for the fixture supply lines, and minimum pressure at the fixture outlet.

**Exhibit G**  
**Page 5 of 12**



# Piping Options

There are three distinct piping methods that make use of Plumb-Pex® Tubing. Due to the flexibility of Plumb-Pex®, one or more of these methods may be utilized in a potable water distribution system installation. System performance, installation time, cost, and accessibility, should all be considered in order to establish the best method for a given installation.

## Home Run (Manifold) System

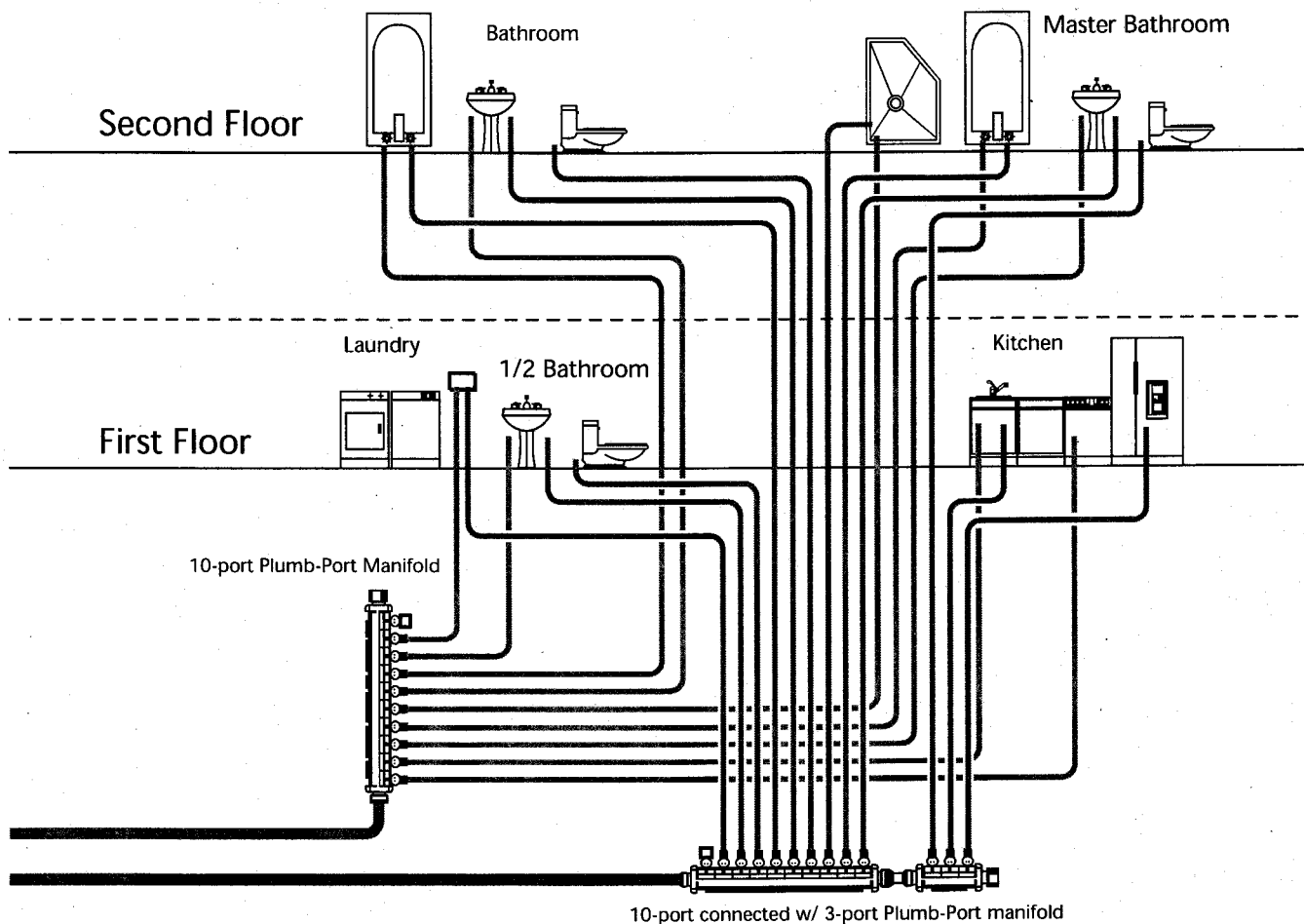
A *Home Run System* utilizes two centrally located manifolds, one for the hot service and one for cold service. Typically, these should be

located at the water source for each, the water meter for cold and the water heater for hot. From these locations Plumb-Pex® Tubing is run to each individual fixture. Depending upon the number of fixtures, the centralized manifolds will have the corresponding number of ports.

The benefits of using a Home Run System with a dedicated line to each fixture is the maintaining of a near constant water pressure, flow and temperature to all fixtures. Additionally, hot water is supplied to fixtures much faster, saving both water and energy. A home run system will utilize the fewest number of fittings while requiring the most tubing of all Pex Piping methods.

RTI Plumb-Port modular plastic manifolds and traditional copper manifolds are both suitable for Home Run System installation.

The following diagram is conceptual only. Some system components may be omitted for clarity. Please follow correct piping practices, engineering principles, and all applicable local Codes during installation.



Home Run Piping System  
w/Plumb-Port Manifolds

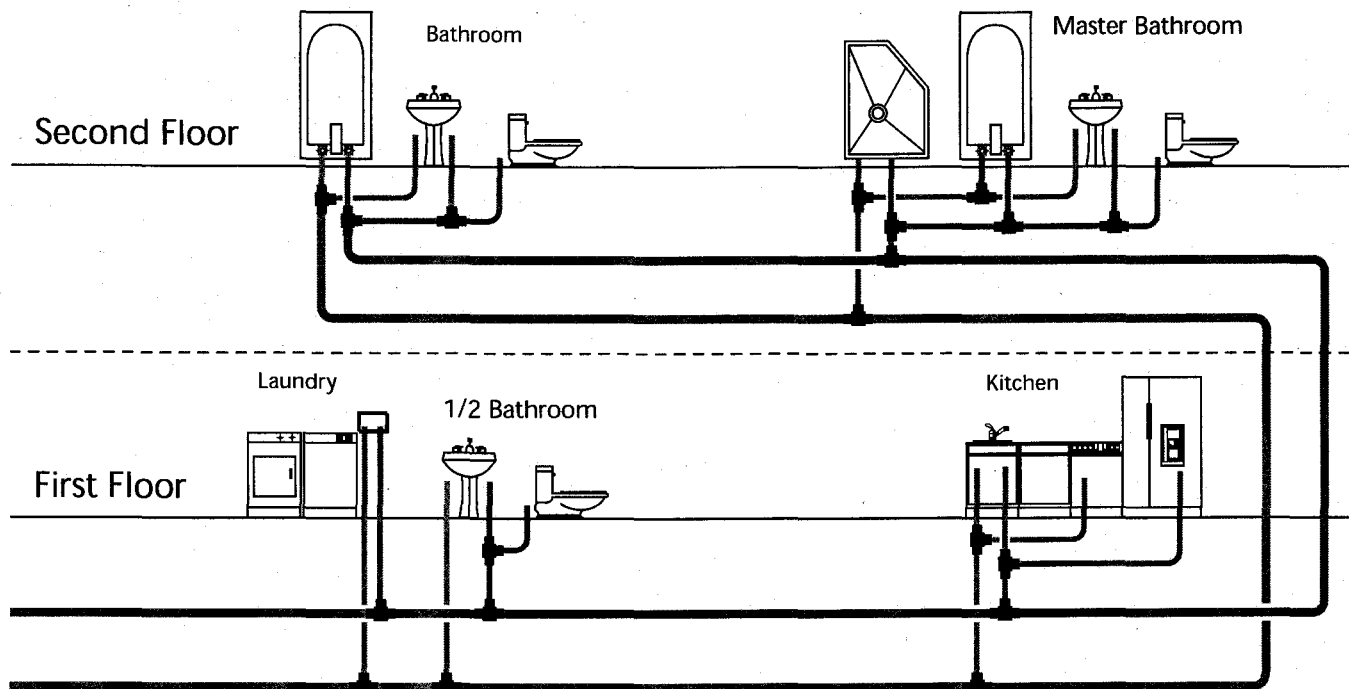
Exhibit G  
Page 6 of 12

## Trunk & Branch System

The *Trunk & Branch System* is the traditional method inherent from non-flexible metal (copper) and plastic (CPVC) pipe. The main hot and cold lines (Trunks) are branched at individual points of service with Tee's, and reduced in size (dependent upon fixtures to be serviced), to supply various fixtures.

While requiring an equal footage of tubing as a traditional rigid pipe system, fewer fittings will be required because many elbows can be eliminated by using the flexibility of Plumb-Pex® Tubing. A Trunk & Branch System will utilize the highest number of fittings while requiring the least tubing of all Pex piping methods. This method of installation will result in a lower overall product cost but be more labor intensive than other Pex Piping methods.

The following diagram is conceptual only. Some system components may be omitted for clarity. Please follow correct piping practices, engineering principles, and all applicable local Codes during installation.



Trunk & Branch Piping System

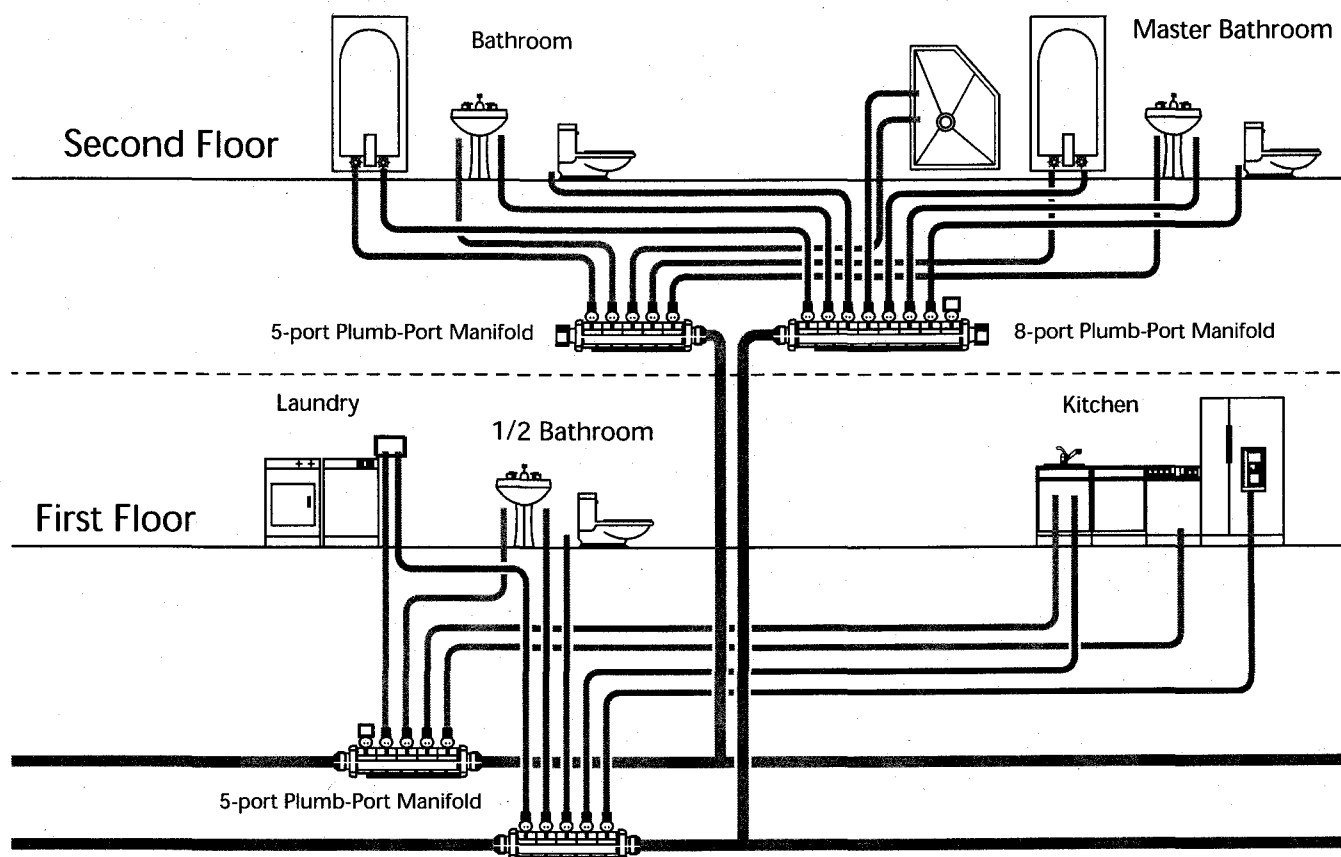
## Zone Manifold System

The *Zone Manifold System* exploits both the Home Run and Trunk and Branch piping methods, providing reduced installation time, less tubing, and isolation of runs. Hot and cold trunk lines are run that are then either branched to remotely located manifolds or include remote manifolds within the run. Manifolds should be placed in the vicinity of a service location, i.e. kitchen, bathroom, laundry. From the remote manifold location, Plumb-Pex® Tubing is run to each individual fixture.

The benefits of using a Zone Manifold System are similar to a Home Run System, with near constant water pressure, flow and temperature to fixtures, and faster hot water delivery. It also provides the benefit of Trunk & Branch System by reducing the amount of tubing required.

RTI Plumb-Port manifolds and brass Mini-Mans are both ideal for a Zone Manifold System installation.

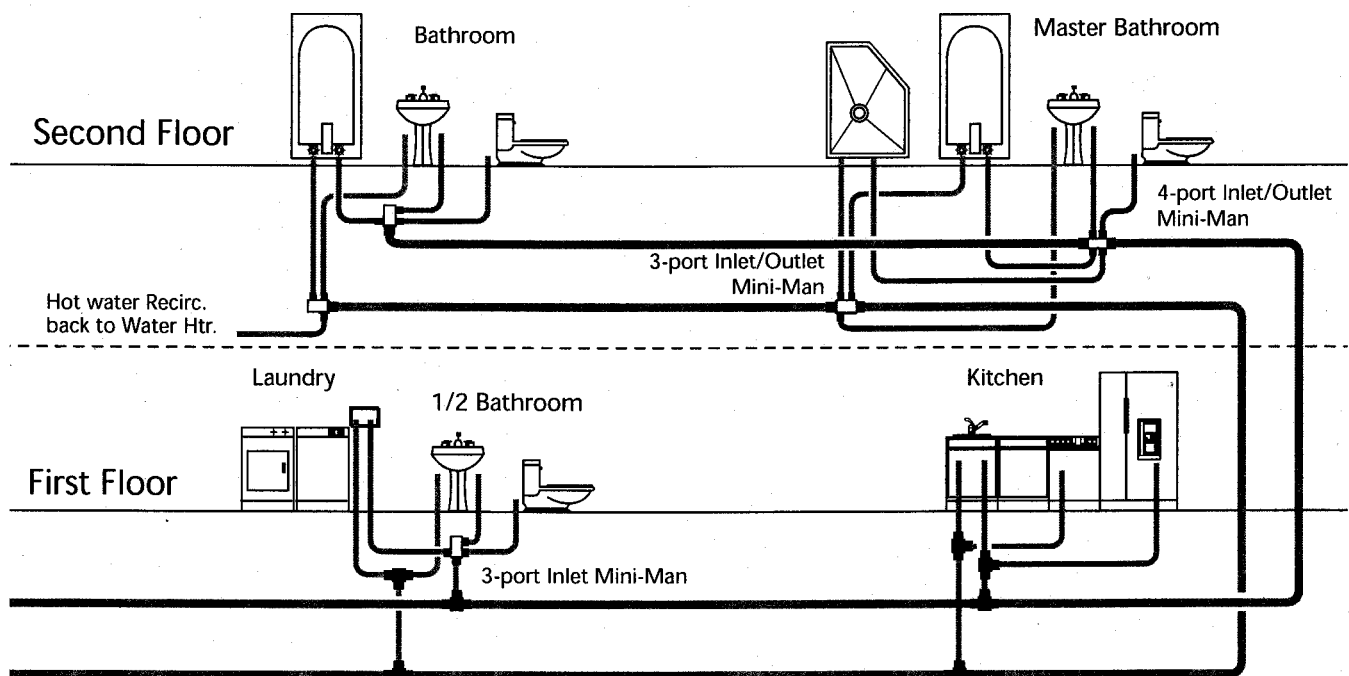
The following diagram is conceptual only. Some system components may be omitted for clarity. Please follow correct piping practices, engineering principles, and all applicable local Codes during installation.



Zone Manifold Piping System  
w/Plumb-Port Manifolds

Exhibit G  
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The following diagram is conceptual only. Some system components may be omitted for clarity. Please follow correct piping practices, engineering principles, and all applicable local Codes during installation.



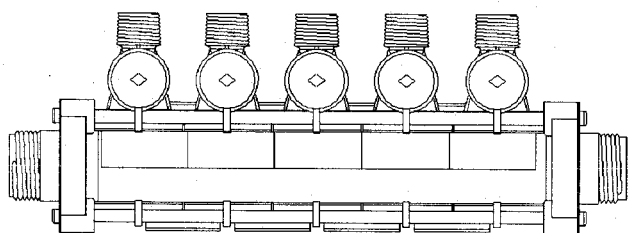
Zone Manifold Piping System  
w/Mini-Man Fittings

# Plumb-Pex® Manifolds

Utilizing manifolds in a Plumb-Pex® System provides several advantages to its operation and installation.

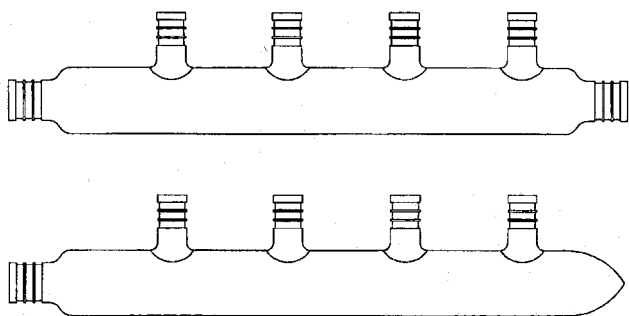
- Reduces installation time/labor
- Requires less fittings
- Maintains near constant pressure
- Increases water flow
- Maintains water temperature
- Provides faster delivery of hot water

## Plumb-Port Manifold



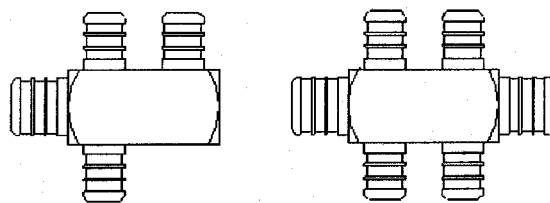
Plumb-Port is a modular plastic manifold for both hot and cold potable water distribution. Similar to a home's electrical service panel, Plumb-Port provides dedicated water lines to service all plumbing fixtures. Each port outlet is equipped with a quarter-turn shut-off valve to simplify both installation and future system service. Plumb-Port is available in 3, 5, 8 and 10 port models that are easily coupled together to satisfy any system requirement. Ports are suitable for either 3/8" or 1/2" Plumb-Pex® Tubing. Color coded (red/blue) valve discs and labels are provided for easy hot and cold line and fixture serviced identification of each port.

## Copper Manifold



Copper manifolds are a versatile manifold option for either Home Run or Zone Manifold Systems where individual isolation valves are not desired. Available in 3, 4, 5, 6 and 8 port models with both "end run" and "in-line" configurations.

## Mini-Man Multi Port



Mini-Man's are a compact multi-port alternative to traditional manifolds. Designed to reduce the installation time, number of required fittings, and tubing, in the Plumb-Pex® System. Mini-Man's are available in both "end run" and "in-line" configurations.

## Manifold Location

A manifold location should be chosen that:

- \* Is accessible for future access.
- \* Provides convenient access to all fixtures. For some applications it may be beneficial to have more than one manifold location.
- \* Permits easy connections to the supply mains.
- \* Provides adequate protection from freezing.

# System Testing

Test pressures shall be in accordance with code requirements as directed by appropriate local jurisdiction. Test pressures should not be allowed to exceed the Plumb-Pex® ratings (page 2). Do not use leak detectors or liquid solutions other than the municipal water supply when testing a Plumb-Pex® system using fluid pressure. In the absence of local code requirements system testing should be provided under water pressure not less than the working pressure under which the system will operate. An air pressure test of (50) psi may be substituted for a water test. In either method of test, the piping shall withstand without leaking or loss of pressure for not less than 15 minutes. **Failure to perform system pressure testing as required by code or as outlined above will void applicable Warranty coverage.**

# Fire Stopping with Plumb-Pex®

Plumb-Pex® Tubing, used in conjunction with approved fire stop sealants, can provide either one or two hour ratings for Plumb-Pex® firewall penetrations. Acting as both a fire stop and smoke stop, fire stop sealants give Plumb-Pex® systems a unique fire stopping advantage over metal and other plastic piping systems.

## Approved/Listed Fire Stop Sealants

The following fire stop sealant products are approved for use with Plumb-Pex® Tubing when installed as per sealant manufacturers design instructions:

Manufacturer	Product	Design No.	Pex Tubing Size
RectorSeal	Metacaulk 1000	F-C-2076	to 1" I.D.
PFP Partners	Firestop 4800DW	PFP/PHV 120-11	to 1" I.D.
Specified Technologies	SpecSeal Series SSS	WL-2100	to 1" I.D.
Johns Mansville Int.	Firetemp CI, CE	JMI/PHV 120-09	to 1-1/4" I.D.

## Fire and Temperature Ratings

Fire stop sealants listed above provide firewall penetration ratings to Fire Test (F), that prevents the passage of flame through wall openings, and the Temperature Rise (T), that prevents transmission of heat through the fire stop.

## Certifications

Listed fire stop sealants are certified ICBO accredited testing laboratory Warnock Hersey and/or Underwriters Laboratories for use in through penetration fire stop systems with Pex tubing.

## System Design

As per sealant manufacturers instructions.

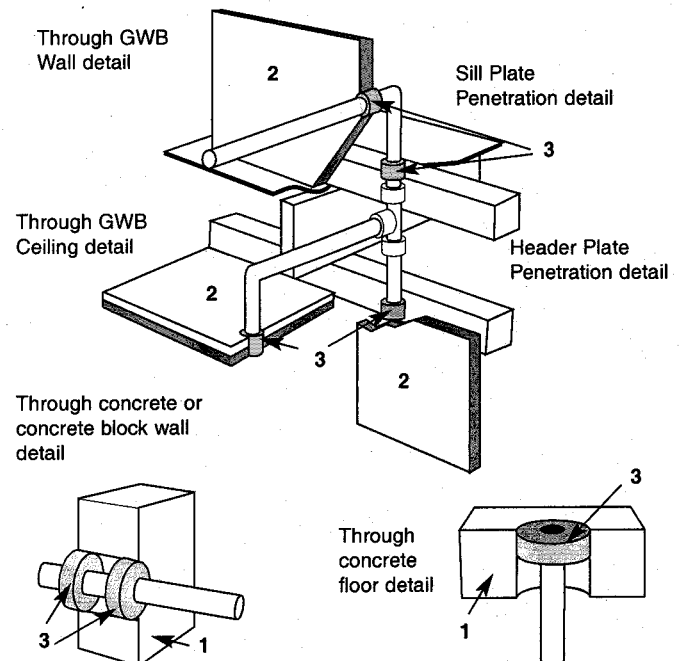
## Alternative Material

Fire stop sealants not listed above, intended for use with Plumb-Pex® Tubing, must be approved by RTI prior to use. Manufacturers Design Drawings and MSDS required.

### Design Example Single Penetrations

Horizontal or Vertical (Floors, Ceilings or Walls)

1	Concrete or Concrete Block
2	Gypsum Wall Board (GWB)
3	Fire Stop Sealant





# **RTI PLUMBING SYSTEMS**

**plumbing systems**

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Please visit us on the World Wide Web at: <http://www.rtisystems.com>

**Exhibit G**  
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**RTI, 11 Farber Drive • Bellport, New York 11713 • (631) 286-0900 • Fax (631) 286-0947**

**PN: K4050-0403**